OCT 12 1922

Charts Depict The Trend—Page 981

IRON TRADE REVIEW

Registration Applied for

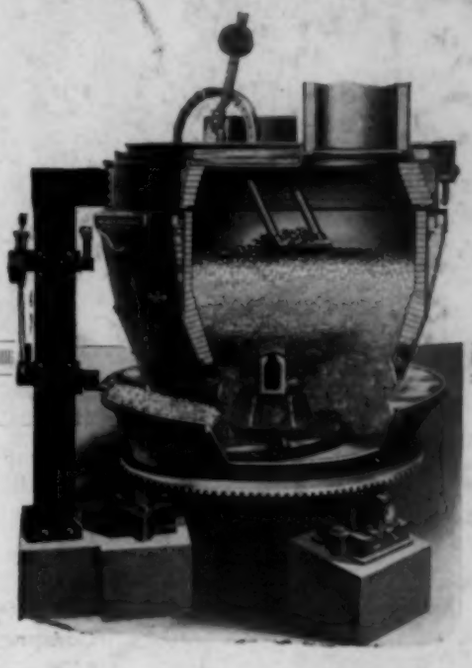
Published Weekly
VOL. LXXI. No. 15

CLEVELAND, OCTOBER 12, 1922

Entered as second-class matter at the post-office in Cleveland, Ohio, under the act of March 3, 1879

Six Dollars a Year
Single Copy 25 Cents

GENERAL LIBRARY
OCT 12 1922
UNIV. OF MICH.



RELIABILITY is that supreme quality which outvalues all others where continuous operation is imperative, without delay or breakdown.

There is no apparatus in a steel plant where such reliable service is more essential than in the gas-making equipment, yet it is conspicuously lacking in most cases.

For Ten Years

The Morgan Pokerless Producer-Gas Machine

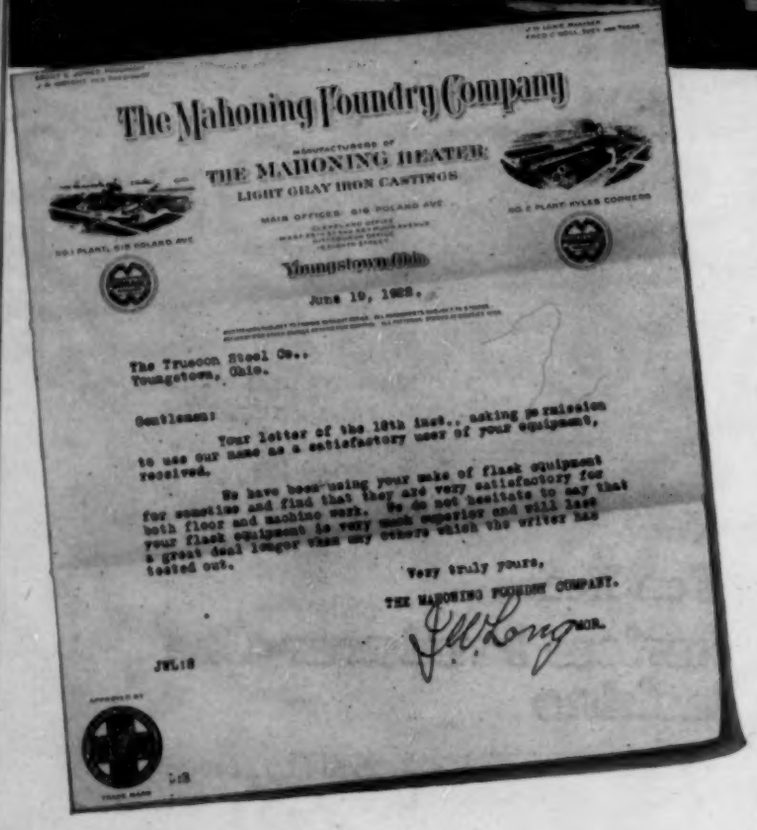
has been making firm friends wherever installed, principally by reason of its absolute reliability. It is the one exception to the general experience with Gas Producers in this respect.

FIVE HUNDRED IN OPERATION

Morgan Construction Company

Worcester **Massachusetts**

Pittsburgh Office: 610 Magee Building



The Mahoning Foundry Company

MANUFACTURERS OF
THE MAHONING HEATER
LIGHT GRAY IRON CASTINGS

MAIN OFFICES: 610 ROLAND AVE

NO. 1 PLANT, 610 ROLAND AVE

NO. 2 PLANT, HYLES CORNERS

Youngstown Ohio

June 19, 1922.

The Truscon Steel Co..
Youngstown, Ohio.

Gentlemen:

Your letter of the 18th inst., asking permission to use our name as a satisfactory user of your equipment, received.

We have been using your make of flask equipment for sometime and find that they are very satisfactory for both floor and machine work. We do not hesitate to say that your flask equipment is very much superior and will last a great deal longer than any others which the writer has tested out.

Very truly yours,

THE MAHONING FOUNDRY COMPANY.

J. W. Long MGR.

JWL:B

Setting the Pace is an Old Story

This letter from the Mahoning Foundry Company is just another proof of the superiority of Truscon Alloy Steel Flasks. The picture shows a few 14" x 20" flasks. Each cope and drag is readily handled by one man. Notice the close fit of the pattern in the flasks shell. That means a big saving in sand and labor. Compare Truscon flasks with the bulky old wood flasks in the background of the picture and see how much floor space is saved. Rigid Truscon construction stands the daily knocks. The heavy pins and brackets do not get out of alignment.

Is it any wonder that Truscon rust resisting alloy steel flasks are the standard of equipment in more than a hundred of the countries largest foundries?

Truscon Steel Co.

Youngstown **Ohio**

Representatives in Principal Cities

TRUSCON ALLOY FLASKS STEEL

FOUNDRY PRODUCTS
TRUSCON STEEL CO

IRON TRADE REVIEW
Registration Applied For
The Authority of Industry National and International
Vol. LXXI Cleveland, October 12, 1922 No. 15

Car Shortage Checks Production

Traffic Situation Forces Piling of Steel at Mills, While Rate of Operation Is Affected in Valleys—Pig Iron Prices Are Softer—Ingot Output Gains in September

NO RELIEF is apparent to the congested transportation situation which is seriously interfering with iron and steel operations over a wide area. Great tonnages of finished steel have continued to accumulate in mill yards especially in the Pittsburgh, Youngstown and contiguous territory where the effect of the freight embargoes on leading systems is most severely felt. The Carnegie Steel Co. now is estimated to have from 100,000 to 150,000 tons of steel piled at its various plants. Other producers are suffering in a similar though lesser fashion. Sheet stocks in the Youngstown district keep around 20,000 tons. Chicago mills, however, have escaped any excessive accumulation. The use by consumers of hundreds of motor trucks at a cost of $1 to $2 per ton is enabling many plants to keep up their steel supplies.

Mill production is under check by the prevailing conditions with some further losses. The American Sheet & Tin Plate Co. is down to 59 per cent.

Coke prices are breaking away from their recent high levels. Sales of furnace coke this week have been at $11 to $12 or a decline of $2. This is bringing coke prices more in line with the market on coal though increased production also is a factor.

A further yielding of pig iron prices in certain districts is apparent this week. Valley basic is 50 cents to $1 and bessemer and foundry 50 cents lower. The southern Ohio iron is down and Buffalo is easier. Buying is on a small scale. Consumers apparently are holding off, awaiting the market to stabilize itself.

Another recession appears in IRON TRADE REVIEW composite of fourteen iron and steel products making the second consecutive week's fall. The average this week is $43.88 as against $44.07 and an average of $43.79 for September.

Buy Steel for 1923

Some buying of finished steel for next year's delivery is coming forward though producers are not inclined to encourage this at this time. Some sheet tonnage for first quarter has been accepted with prices to be fixed later. A few orders similarly have been taken in tin plate though a lot of 275,000 boxes was declined. Some pipe mills have readjusted preferential and cash discounts to apply on Pittsburgh rather than on delivered quotations and the effect is to raise the net prices.

New Awards Heavier

New structural steel business shows a large expansion due mainly to important railroad and industrial enterprises. The week's total is 44,000 tons, the largest in several months. The 20,000-ton award for the new tube works of the National Tube Co. at Gary has helped greatly to swell the total. Other important contracts are 5500 tons for Pennsylvania railroad shops at Juniata, 7000 tons for power plant projects and 2500 tons for a bascule bridge at Los Angeles. Reinforcing steel jobs also have aggregated a heavy tonnage this week with 5900 tons reported. For a water project at Tulsa, Okla., 5000 to 10,000 tons are about to be placed.

Plate tonnage has fallen farther short of open capacity and keener competition in this product is bringing an easier tone of prices. Some of the independent mills now are disposed to quote lower than a few weeks ago. The Carnegie Steel Co. is the low bidder at 1.95c Pittsburgh on tonnage for the Big Four and New York Central railroads for fourth quarter delivery. There is more talk of 1.90c being done in some cases not only on plates but on shapes and bars, with 2.00c the minimum level of the independents.

Shipments of British pig iron from the port of Middlesbrough to the United States in September were 31,119 tons, the largest in any month in 10 years. August arrival of foreign pig iron in this country totaled 17,105 tons of which 10,000 tons came through Middlesbrough. Foreign iron prices are slightly higher and new sales are lighter. The first cargo of English coke to reach New York since 1901 came in this week.

Ingot Output Keeps Up

Recovery of steel ingot production from the recent strike curtailment has kept pace with that of pig iron. This is shown by the September figures of steel ingot production which represent a gain of 15.7 per cent over August as compared with an increase of 15 per cent in pig iron. The September production was at the rate of 33,750,000 tons annually as against an annual rate of 29,150,000 tons in August but still is slightly below July.

Business Trend and Chart Section Page 981

IRON TRADE REVIEW

Registration Applied For

The Authority of Industry National and International

Published Every Thursday by
THE PENTON PUBLISHING CO., CLEVELAND
Member, Audit Bureau of Circulations, Associated Business Papers, Inc., and National Publishers Association

BRANCH OFFICES

BOSTON - - - - - - - - - - - - 426 Old South Bldg.
CHICAGO - - - - - - - - - - 1147 People's Gas Bldg.
CINCINNATI - - - - - 501-505 Commercial Tribune Bldg.
NEW YORK - - - - - - - 2205-2206 No. 220 Broadway
PITTSBURGH - - - - - - - - 2148-49 Oliver Bldg.
WASHINGTON - - - - - - - - - 84 Home Life Bldg.
SAN FRANCISCO - - - - - - - 675 Monadnock Bldg.

FOREIGN OFFICES

BIRMINGHAM, ENG. - - - - - - - Prince's Chambers
LONDON, ENG. - 2-3 Caxton House, Westminster, S. W. 1.
PARIS, FRANCE - - - - - - - - - 224 Rue de Rivoli

Cable Address, IROTRAPEN, London

Subscription, United States, Cuba and Mexico, $6 per year. Canada and other Foreign Countries, $8.50 per year.
Entered at the Postoffice at Cleveland as Second Class Matter

Copyright 1922 by The Penton Publishing Co.

IN THIS ISSUE

	Page
Iron and Steel Market Review	957
Editorials	958, 959
Iron, Steel and Scrap Prices	960, 1016, 1020, 1024
Index to Market Reports	967
Iron and Steel Markets	961 to 971
Foreign Markets	976 to 979
Business Trend Section	981 to 984
Buying of Iron in Britain Gains	976
American Aid to Europe Is Urged	980
France Must Work with Germany	985
Reviews Blast Furnace Practice	989
Using Steam from Waste-Heat Boilers	995
New Spirit Guides Management	996
News of Societies	1001
Tool Builders Urge Friendship	1002
August Exports Continue Decline	1003
Steel Treaters and Forgers Meet	1004
Railroad Tool Buying Continues	1013
Construction and Enterprise	1015
New Trade Publications	1022

Alloy Steel Is an Essential

LAST week's convention of the American Society for Steel Treating, American Drop Forging institute and Drop Forge Supply association in Detroit was particularly significant in that it linked together more closely two allied divisions of the iron and steel industry. Although serving two distinct fields, the societies found enough in common to make the meetings a success. A number of those who attended, being members of both steel treating and forging societies, found it possible to attend the sessions in which they were most interested, thus contributing actively to both organizations with a minimum of time and expense. The joint convention arrangement also permitted members of the forging industry to attend the steel exhibition which included drop forging equipment and products.

One outstanding feature of the convention was the unusual interest shown in the daily inspection trips to manufacturing plants. The number of visitors taking the trips was by far greater than at any previous convention, one reason possibly being that Detroit, the center of the country's automotive industry, offers unusual opportunity in this line. But another reason is that co-operative study of manufacturing methods by leading technical societies during recent years has sharpened the desire to see how typical operations are performed in different plants. Technical papers and discussions presented at conventions can be read at leisure but plant inspection must be done when opportunity affords. It will not be surprising to find in conventions of the future even still greater interest given to plant inspection.

Perhaps the most impressive thought carried away from the convention was that the use of alloy steel, coupled with advances in the methods of forging and heat treating, has been largely responsible for the rapid strides in the development of the automobile and airplane. The technical papers, as well as the exhibits, served to emphasize the ever increasing importance of vanadium, chromium, nickel, molybdenum and other alloys in steels for automotive products. While further possibilities for the application of alloy steel still are open for extensive investigation, the period of pioneering has passed, and in the automotive industry this special type of steel has become firmly entrenched as a most essential material of construction.

Getting the Facts in Coal

ACTION of the bituminous coal operators at Cleveland the past week in declining to accede to the request of the President to suggest names for the national fact-finding commission in the coal industry, may be construed in two ways. Either it was an act of consideration to allow the President a free hand in his selections for the commission without suggestion as influence from the coal producers themselves; or it was a direct refusal to co-operate in which case it was highly discourteous.

The situation must be considered in the light of previous circumstances. Unfortunately for themselves the coal operators have lost the confidence of the public ever since their complete surrender to the demands of the miners in the shameful Cleveland agreement of two months ago which conflicts with all principles of rational economic readjustment. As a part of that agreement, it was provided that the operators and the miners union should meet at this time to name a commission of their number to survey and study the ills of the business and report recommendations for improvement. Taken with the wage agreement itself which unfairly penalizes the public, it cannot be said that this action had the ring of complete sincerity. Rather it smacks of a desire to placate an irritated public by doing defensively a thing obviously demanded by conditions, but without much desire or purpose to get constructive results. The fact that the operators decided their own committee on wage scale adjustment was the proper one to make such a survey, heightens the lack of faith in the whole procedure which most men will feel.

Seemingly if the coal industry is to be put in a position to function for the best interests of operators,

miners and general public, the pressure must come from without. The operators have given no trustworthy evidence that they are willing seriously to make the attempt; little can be hoped from the miners' side. The fact-finding commission authorized by congress presents the best hope of something beneficial coming out of the present agitation. Yet questions as to the proper limits that the commission may go in the examination of private affairs and other technical obstacles that apparently will be raised do not warrant high expectations of definite results in the near future. Genuine co-operation from the operators will be necessary to assume substantial progress.

Industry's Interest in the Blocs

THE session of congress just ended saw the formation of the agricultural bloc, whereby most western and some southern senators and representatives bolted their political parties temporarily to form a sort of legislative flying wedge in the interest of agricultural legislation. Party leaders have denounced this occasional fall from grace and warned of the havoc irregularity plays with party government. The President has decried government by blocs. Business interests in the East have looked askance at this obliteration of party differences, fearful that what advantage was won for the West would be at the expense and to the detriment of the East.

The West, of course, will have no more senators and representatives after the November election than before, but test straws foreshadow the election of more virile leaders and give promise of more intense bloc consciousness. The program of the bloc obviously has not yet been mapped out, and the only guide to the bloc's future is its past. Since the advent of the Harding administration congress, largely through the bloc, has advanced $3,500,000 to farmers in the shape of seed loans. It has amended the War Finance Corp. act to permit loans for agricultural and livestock purposes. It has assured farmer representation on the federal reserve board. It has legalized co-operative marketing for farm products. It has increased the amounts available for farm loans. It has passed the corrective grain-futures and packer-stockyard acts. It has continued in the Fordney-McCumber tariff act the earlier protection afforded to farm products.

The bloc naturally seeks to further the interests of the farmer. And who is the farmer? He is the biggest single buyer of manufactured products. Next to the railroads he is the largest consumer of steel. He takes 46 per cent of the wood manufactures of the country. He buys more clothing, textiles and leather goods than any other class. His buying has enabled the automobile and truck manufacturers to set new high production marks this summer. Upon him more than upon anyone depends the country's prosperity.

The iron and steel industry, along with others, may be apprehensive that the farmer, made vocal by the agricultural bloc in congress, will attempt to saddle more of the burden of taxation upon industry; it may be fearful that the representatives of the farmer will injure the delicate fabric of industrial economics. But it should quiet its fears with the knowledge that if the farmer does not buy industry will have no taxes to pay, and further, the farmer may be relied upon to know that since he is the largest consumer he is the heaviest taxpayer, in the final analysis. Industry might well realize that the bloc is but a phase of the country's development, that radicalism has been short-lived on the prairies, and what appears radical today may become conservative tomorrow.

"Buying Progress" in Business

JUST before the beginning of the world war one of the ambitious manufacturing interests in the iron and steel industry decided to attempt what might appear to the conservative as a visionary, impractical thing. What it determined to do, in a word, and literally, was to "buy progress."

The company had a meritorious product, the result of experiment and experience. It was convinced of the great field for its use. It knew it could buy the ability, intelligence and allegiance of men in manufacturing, selling and distributing, yet it seemed to lack an important element which it considered necessary to forge to the front, swiftly and decisively. What the company wanted most of all to do was to overtake competitors long in the field before it.

Beginning in a very small way, the company grew slowly, or "naturally," according to the old-accepted idea of the building of a business. It felt reasonably sure of a steady gain in business, with the fruit of its enterprise generations ahead. Then its leaders, with viewpoint, considered if there were not better ways for promoting the industry, accelerating its growth. At the end of five years, they figured carefully, the business "normally" would reach a certain stage. They thought of all expedients, and they calculated the value of advertising.

Advertising was put to the test. The line of "natural growth" was definitely known; this was to be a race against time, probably as keen a test of the power of advertising as ever was devised. Trade moved faster. At the end of two and one-half years the company had attained five years of "natural progress." They decided to buy ten more years of progress in five, and again they won. They are still buying progress.

If this is to be called "mushroom growth," consider that the trademark of the product referred to is an asset worth millions—that the plant, organization and all that created it could be wiped out, and yet the value of that mark would suffer no depreciation, if the quality of the material was maintained.

Could any other words than "buying progress" so explicitly define the meaning and significance of well-directed advertising?

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products, Yesterday, One Week, One Month, Three Months, One Year and Nine Years Ago

October 10, 1922	October 3, 1922	September, 1922	July, 1922	October, 1921	October, 1913
$43.88	$44.07	$43.79	$37.50	$35.46	$24.91

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

SCRAP PRICES, PAGE 1024, WAREHOUSE, PAGE 1016, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1020

Iron and Steel Prices

Pig Iron

Bessemer, valley	$33.50
Bessemer, Pittsburgh	35.27
Basic, valley	30.50 to 31.00
Basic, Pittsburgh	32.27 to 33.77
Basic, Buffalo	31.00 to 32.00
Basic del., eastern Pa.	30.00 to 31.00
Malleable, valley	33.50
Malleable, Pittsburgh	35.27
Malleable, Chicago	32.00
Malleable, Buffalo, furnace	31.00 to 32.00
Malleable, del., eastern Pa.	33.00 to 34.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del. Phila.	35.13 to 36.23
No. 1X, Buffalo	33.00 to 34.00
No. 2 foundry, valley	32.50 to 33.00
No. 2 foundry, Pittsburgh	34.27 to 34.77
No. 2 foundry, Buffalo	31.00 to 32.00
No. 2 foundry, Chicago	32.00
No. 2 foundry, Granite City	33.00 to 34.00
No. 2 foundry, Ironton furnace	33.00 to 34.00
No. 2 foundry, Cleveland del.	35.00 to 35.50
No. 2 foundry, del., Phila.	32.13 to 33.26
No. 2 foundry, N. J. tidewater	32.39 to 33.76
No. 2X, eastern del., Phila.	33.13 to 34.26
No. 2X, east. N. J. tidewater	33.39 to 34.76
No. 2X, eastern del. Boston.	36.65 to 38.65
No. 2X, foundry, Buffalo fur.	32.00 to 33.00
No. 2X, Buffalo del. Boston.	37.91 to 38.91
No. 2 southern, Birmingham	28.00 to 30.00
No. 2 southern, Cincinnati	32.05 to 34.05
No. 2 southern, Chicago	34.01 to 36.01
No. 2 southern, Philadelphia	35.80 to 37.80
No. 2 southern, Cleveland	34.00 to 36.00
No. 2 southern, Boston	34.89 to 37.60
No. 2 southern, St. Louis	33.67 to 34.17
No. 2X, Virginia furnace	33.00
No. 2X, Virginia Philadelphia	38.17
No. 2X, Virginia Jersey City	38.54
No. 2X, Virginia Boston	38.92
Gray forge, eastern Pa.	31.50 to 32.50
Gray forge, val. del. Pitts.	33.27 to 33.77
Low phos., standard, valley	37.00 to 38.00
Low phos., standard, Phila.	41.00
Low phos., Lebanon furnace	35.00 to 37.00
Charcoal, Birmingham	32.00 to 35.00
Charcoal, Superior, Chicago	36.15

Silvery Iron
8 per cent base

Jackson county, O., furnace	$41.50
Tennessee, Chicago delivery	Nominal
Ohio brands, Chicago	46.29

Bessemer Ferrosilicon
Jackson County, Ohio, furnace

10 per cent	$49.50 to 50.50
11 per cent	52.80 to 53.80
12 per cent	56.10 to 57.10
13 per cent	58.00 to 59.00
14 per cent	66.10 to 67.10

Ferroalloys

Ferromanganese, delivered, Pittsburgh	$105.89
xFerromanganese, 80 per cent, English, c.i.f. Atlantic port	101.10
Ferromanganese, 80 per cent, German, c.i.f. Atlantic port	Nominal
Spiegel, 19 to 21 per cent furnace spot nominal	37.00 to 38.00
xSpiegel, 20 per cent English, c.i.f. Atlantic port	39.25
Ferrosilicon, 50 per cent contract freight allowed	70.00 to 75.00
Ferrotungsten, standard, per pound contained	80.00 to 85.00
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon, per pound contained, makers plant	12.00c to 14.00c
Imported ferrochrome, 4 to 6 per cent carbon	12.00c
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producers plant, per net ton	$200.00

xDuty paid

Coke

Beehive, Ovens

Connellsville furnace	$12.00 to 12.50
Connellsville foundry	13.50 to 14.50
Pocahontas furnace	10.50 to 11.00
Pocahontas foundry	nominal
New River furnace	11.00 to 12.00
New River foundry	14.00 to 15.00
Wise county furnace	11.00 to 12.00
Wise county foundry	13.00 to 13.50
Alabama furnace	8.00 to 8.50
Alabama foundry	9.00 to 10.00

By-Product

Foundry, Newark, N. J., del.	$14.84 to 16.02
Foundry, Chicago, ovens	13.50
Foundry, Boston, delivered	16.50
Foundry, Granite City, Ill., ovens	14.00
Foundry, Alabama	$8.50 to 10.00

Semifinished Material

BILLETS AND BLOOMS
(4 x 4-inch)

Open-hearth, Pittsburgh	$40.00 to 45.00
Open-hearth, Youngstown	40.00 to 45.00
Open-hearth, Philadelphia	45.17
Bessemer, Pittsburgh	40.00 to 45.00
Bessemer, Youngstown	40.00 to 45.00
Forging, Pittsburgh	45.00 to 50.00
Forging, Philadelphia	50.17 to 52.67

SHEET BARS

Open-hearth, Pittsburgh	$40.00 to 45.00
Open-hearth, Youngstown	40.00 to 45.00
Bessemer, Pittsburgh	40.00 to 45.00
Bessemer, Youngstown	40.00 to 45.00

SLABS

Pittsburgh and Youngstown	$40.00 to 45.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$45.00 to 47.50
Grooved skelp, Pittsburgh	2.00c to 2.25c
Universal skelp, Pittsburgh	2.00c to 2.25c
Sheared skelp, Pittsburgh	2.00c to 2.25c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.00c to 2.25c
Structural shapes, Phila.	2.275c to 2.425c
Structural shapes, New York	2.29c to 2.44c
Structural shapes, Chicago	2.10c to 2.25c
Tank plates, Pittsburgh	2.00c to 2.25c
Tank plates, Philadelphia	2.275c to 2.575c
Tank plates, New York	2.29c to 2.59c
Tank plates, Chicago	2.10c to 2.30c
Bars, soft steel, Pittsburgh	1.90c to 2.25c
Bars, soft steel, Philadelphia	2.225c to 2.425c
Bars, soft steel, New York	2.24c to 2.44c
Bars, soft steel, Chicago	2.00c to 2.25c
Bars, forging, Pittsburgh	2.25c to 2.50c
Bars, rail steel, Chicago	2.00c
Reinforcing bars, Pittsburgh	2.00c to 2.25c
Bar iron, common, Phila.	2.325c to 2.575c
Bar iron, common, New York	2.34c to 2.59c
Bar iron, common, Chicago	2.50c

Hoops, Bands, Shafting

Hoops, Pittsburgh	2.90c to 3.50c
Bands, Pittsburgh	2.90c to 3.50c
Cotton ties, per bundle Pittsburgh	$1.13
Cold finished steel bars, Pittsburgh base	2.50c to 2.75c

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open hearth rails, mill	43.00
Relaying rails, St. Louis	28.00 to 35.00
Relaying rails, Pittsburgh	28.00 to 32.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.85c to 3.00c
Spikes, small and boat	3.50c to 3.75c
Spikes, railroad, Chicago	2.85c to 3.00c
Track bolts, Pittsburgh	3.85c to 4.50c
Track bolts, Chicago	3.85c to 4.00c
Tie plates, Pittsburgh	2.35c to 2.50c
Tie plates, Chicago	2.35c

Wire Products

100 lbs. to Jobbers in Carloads

Wire nails, Pittsburgh	2.70c
Plain and annealed wire, Pitts.	2.45c
Galvanized wire, Pittsburgh	2.95c
Barbed wire, painted, Pitts.	2.85c
Barbed wire, galv., Pittsburgh	3.35c
Polished staples, Pittsburgh	2.85c
Galvanized staples, Pittsburgh	3.35c
Coated nails, count keg, Pitts.	2.20c
Woven wire fencing (retailers)	68 off
Woven wire fencing (jobbers)	70½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts.	6.00c
Sheet piling base, Pittsburgh	2.05c to 2.55c
Hot rolled strip steel, Pittsburgh stamping quality	2.90c to 3.50c
Cold rolled strip steel, hard coils, 1⅛ inches and wider by 0.100-inch and heavier, base	4.50c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pittsburgh	3.35c to 3.75c
No. 28, bessemer, Pittsburgh	3.35c to 3.75c
No. 28, open-hearth, Phila.	3.675c to 3.825c
No. 28, open-hearth, Chicago	3.64c to 3.69c

TIN MILL BLACK

No. 28, open-hearth, Pittsburgh	3.35c to 3.75c
No. 28, open-hearth, Chicago	3.69c

GALVANIZED

No. 28, open-hearth, Pittsburgh	4.35c to 4.75c
No. 28, bessemer, Pittsburgh	4.35c to 4.75c
No. 28, open-hearth, Phila.	4.675c to 4.825c
No. 28, open-hearth, Chicago	4.64c to 4.69c

BLUE ANNEALED

No. 10, open-hearth, Pittsburgh	2.50c to 2.85c
No. 10, bessemer, Pittsburgh	2.50c to 2.85c
No. 10, open-hearth, Phila.	2.825c to 3.075c
No. 10, open-hearth, Chicago	2.84c to 2.89c

*Lowest prices represent American Sheet & Tin Plate Co. schedule.

Tin Plate

Per 100 lb. box.

Tin plate, coke base, Pitts.	$4.75

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv
1 to 3-inch, butt steel	68	56½
1 to 1½-inch, butt iron	34	19

Boiler Tubes

Carload Discount 4 Points Lower

Steel, 3½ to 13 inches, l. c. l.	48 to 50 off
Charcoal iron, 3¼ to 4½ inches l. c. l.	16 off
Seamless, hot rolled, 3¼ to 4-in., l. c. l.	47 off

Cast Iron Water Pipe

Class B Pipe

Fourinch, Chicago	$56.20
Six-inch and over, Chicago	52.20
Four-inch, New York	60.80
Six-inch and over, New York	55.30
Four-inch, Birmingham	47.50 to 48.00
Six-inch and over, Birmingham	43.00 to 43.50
Three-inch, Birmingham	56.50 to 57.00

Class A pipe is $4 higher than Class B.

Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Oct. 11, 1922	Sept. 1922	July 1922	Oct. 1921
PIG IRON				
Bessemer, valley, del., Pittsburgh	$35.27	$35.27	$26.76	$22.06
Basic valley, del., Pittsburgh	32.27	34.27	26.76	21.16
*No. 2 foundry, del., Pittsburgh	34.27	37.02	26.16	22.96
*No. 2 foundry, Chicago	32.00	32.00	24.65	21.50
Lake Superior charcoal, Chicago	36.15	36.15	31.65	32.50
Malleable, valley	33.50	34.00	24.25	20.25
Malleable, Chicago	32.00	32.00	24.65	21.50
*Southern No. 2, Birmingham	28.00	26.25	18.50	19.00
*Southern Ohio, No. 2 Ironton	33.00	33.75	24.15	21.00
Basic eastern del., eastern Pa.	31.00	30.00	26.00	20.50
**No. 2X, Virginia furnace	33.00	33.00	26.00	23.25
**No. 2X, eastern del. Phila.	33.76	34.25	27.90	22.00
Gray forge val. del., Pittsburgh	33.27	36.02	25.76	21.96
Ferromanganese, del., Pittsburgh	105.89	80.69	72.29	61.65
SEMIFINISHED MATERIAL—				
Sheet bars, bessemer, Pittsburgh	40.00	39.50	35.00	31.50
Sheet bars, open-hearth, Pittsburgh	40.00	39.50	35.00	31.50
Billets, bessemer, Pittsburgh	40.00	39.50	35.00	30.00
Billets, open-hearth, Pittsburgh	40.00	39.50	35.00	30.00
FINISHED MATERIAL—				
Steel bars, Pittsburgh	2.00	2.00	1.70	1.60
Steel bars, Chicago	2.00	1.98	1.75	1.75
Steel bars, Philadelphia	2.325	2.375	2.025	1.95

*1.75 to 2.25 silicon

	Oct. 11, 1922	Sept. 1922	July 1922	Oct. 1921
FINISHED MATERIAL Continued				
Iron bars, Philadelphia	$2.325	$2.325	$2.00	$1.95
Iron bars, Chicago mills	2.50	2.25	1.80	1.75
Beams, Pittsburgh	2.00	2.00	1.70	1.60
Beams, Philadelphia	2.325	2.375	2.025	1.95
Beams, Chicago	2.10	2.08	1.75	1.78
Tank plates, Pittsburgh	2.00	2.20	1.70	1.60
Tank plates, Philadelphia	2.425	2.575	2.025	1.95
Tank plates, Chicago	2.10	2.08	1.75	1.78
Sheets, blk., No. 28, Pittsburgh	3.50	3.40	3.15	3.00
Sheets, blue anl., No. 10, Pitts.	2.60	2.50	2.40	2.50
Sheets, galv., No. 28, Pittsburgh	4.50	4.40	4.15	4.00
Wire nails, Pittsburgh	2.70	2.70	2.40	2.90
COKE—				
Connellsville furnace, ovens	11.00	11.00	10.65	3.25
Connellsville foundry, ovens	13.00	12.75	11.40	4.50
OLD MATERIAL—				
Heavy melting steel, Pittsburgh	21.50	19.50	16.60	14.00
Heavy melting steel, east. Pa.	18.00	17.10	15.00	12.25
Heavy melting steel, Chicago	18.50	18.15	15.10	12.50
No. 1 wrought, eastern Pa.	22.50	21.25	18.25	15.85
No. 1 wrought, Chicago	20.50	19.95	15.20	14.65
Rails for rolling, Chicago	20.50	19.40	16.00	14.00

**2.25 to 2.75 silicon

Iron Market Finds Slight Relief

Increased Output Offset by Transportation Difficulties and Growing Demand—Eastern Markets Report Higher Prices—Pittsburgh Sales Show Reductions—Chicago Market Firm—Melters Inquire for Round Lots—Sizable Tonnages Sold

Philadelphia, Oct. 10.—The pig iron market has developed a strong feature, the principal reason being the inability of steelmakers to deliver on merchant contracts as rapidly as the iron is wanted. A number of consumers, including some large interests, are looking elsewhere for iron and in some cases are paying several dollars more than last week. Sales also are being made at the old prices, the price situation thus reflecting considerable range. This is particularly true of iron for prompt and nearby delivery. High phosphorus continental foundry iron just arrived has been sold at $30, duty paid, tidewater. The same grade for October shipment from abroad has been sold at $23 to $24. Eastern Pennsylvania foundry still commands $31 to $32, base furnace, plus $1 for differentials. Several sizable lots of basic iron have been sold at $1 more than last week and the market is now $31, delivered Eastern Pennsylvania. Pig iron arrivals at this port last week included 3000 to 4000 tons of low phosphorus, and at Baltimore 1000 tons of this grade.

Chicago Market Quiet

Chicago, Oct. 10.—The pig iron market here is quiet and firm at $32 furnace. Inquiry for the first quarter is increasing but few sales are being made and these only to cover definite castings contracts. Buyers are cautious but appear likely to cover soon through the first quarter. Car supply generally is better and the full output is being moved. Inquiry for malleable iron from Wisconsin users is increasing. Wisconsin users are asking for 1600 tons of malleable and 1200 tons of foundry iron. Illinois melters are asking for 1000 tons of foundry iron and 300 tons of low phosphorus. There has been considerable inquiry for small lots of foundry grades. Spot offerings are absorbed rapidly indicating that stocks are low. Jackson county silveries are quiet. One maker is asking $41.50, furnace, while another is quoting $1 higher. Southern iron is offered at $28 for the last and first quarter delivery but the iron is believed available at $27. One producer is quoting $30. The movement from the South is improving although still hampered. The lighting of a second Federal stack and the bank of a Milwaukee stack are the only changes noted in production. Preparations are being made for blowings in the third Iroquois stack soon. Present production is being made from two Federal stacks and two Iroquois stacks and one stack each at Mayville and Duluth. The Milwaukee stack recently blown in had been stopped until sufficient coke of proper quality could be obtained.

Market Prices Yielding Slightly

Pittsburgh, Oct. 10.—Yielding to the influence of the activity of steel works

Market Report Index

	Prices page	Market page
Weekly Market Review	...	957
Pig Iron	960	961
Coke	960	963
Bars	960	964
Nuts, Bolts and Rivets	1020	964
Hoops and Bands	960	964
Ore	1020	964
Plates	960	965
Tin Plate	960	965
Semifinished Steel	960	966
Warehouse	1016	966
Scrap	1024	966
Sheets	960	967
Structural Shapes	960	968
Cars and Track Materials	960	969
Wire	960	969
Concrete Reinforcing Bars	960	970
Merchant and Cast Pipe	960 and 1020	970
Ferroalloys	960	970
Nonferrous Market	971	971
British Market (cable)	977	976
Birmingham Market	977	976
Austrian-Czechian Market	...	978
Canadian Market	...	978
Machine Tools	1010	1010

and blast furnaces, pig iron prices now are slightly lower than last week. For instance, basic now is openly quoted at $31, valley, and even $30.50 is available from one or two valley interests on tonnages. The sale of 750 tons of basic to the Pittsburgh Steel Foundry Co., Glassport, Pa., by a neighboring steel works furnace is noted, the delivered price figuring out to be below the quotation named by the Cambria Steel Co., which has increased its basic price to $31, Johnstown, an advance of 50 cents over a week ago. The latter company's other quotations, however, remain the same with bessemer at $33, malleable $32 and No. 2 foundry at $32.50, furnace, with $1.77 freight rate to Pittsburgh common points. In the past three or four weeks it has booked in excess of 15,000 tons of various grades of pig iron and thus has accumulated most of the going business. Because of the fact that its quotation was a point or two lower than those offered by others, however, several prospective buyers have withheld their orders for the time being to see if the market will sag any further. During the past week, however, this interest has taken orders for about 2000 tons of foundry iron, the largest single order involving 1000 tons. Another order involves 200 tons of malleable to a nearby consumer. Valley bessemer now is quoted at $33.50 and that is the valley quotation on malleable as well. Valley producers of No. 2 foundry iron (1.75 to 2.25 silicon) quote this grade at $33, spot market; small tonnages have been booked at that figure while larger lots have carried a $32.50 price. Interest in low phosphorus iron is confined to small tonnage orders at $37 to $38, valley. A canvass of the trade today develops the fact that new inquiries are at a low ebb notwithstanding the fact that users in various directions are known to need iron. Shipments still are hampered by railroad tieups although deliveries on the Baltimore & Ohio and the Pittsburgh & Lake Erie continue, and service is expected to resume on the Pennsylvania railroad tomorrow night after the 10-day embargo ends.

Market Volume Broadens

New York, Oct. 10.—An enlarged pig iron business is being done in this district. Requests for deliveries on orders are increasing and the melt seems to be heavier. A large radiator company which inquired for 2000 tons is understood to have bought foreign iron against this inquiry. A large pump company is inquiring for a total of more than 2000 tons for fourth quarter shipment to three of its plants. The General Electric Co. is in the market for some tonnage for Elmira. Several other inquiries, aggregating about 4500 tons, are before the trade. Most sales of domestic iron are bringing $32, furnace, for 1.75 to 2.25 silicon, plus $1 differentials for silicon. Both Buffalo and eastern Pennsylvania foundry have sold in attractive tonnages, however, at $31, base furnace. On central Pennsylvania iron not much of which now is being sold in the East, the minimum is $34, base furnace. Some more Duluth malleable iron, brought down to Buffalo by lake carriers, has been sold in this district at $32, Buffalo. Eastern Pennsylvania copper-bearing low phosphorus has sold at $36, furnace.

Prices on foreign iron have gone up somewhat. English and French iron, equivalent to American standard No. 2X, for November shipment from abroad, can be had at $28, duty paid, tidewater, and some for October shipment is offered at $28.50. These are minimum prices and some of this iron has sold at higher figures. High phosphorus English and continental foundry iron is bringing $24 to $26.50, duty paid tidewater, ranging from November shipment from abroad to ex-arrival. For some of this iron already arrived, nearly $27 was paid last week. It now is difficult to get Scotch iron under $31, duty paid, for iron averaging 2.90 to 3 per cent silicon.

Extended Statistics of American Iron and Steel Production and Ingot and Casting Output, page 1026

Transportation Still Difficult

Cleveland, Oct. 10—High coke prices, lack of cars and other transportation difficulties continue to be the determining influences in the pig iron market. Iron is being diverted into those channels which offer the quickest means for shipment, and in some instances is being purchased in other districts for shipment here, this resulting in a diversity of prices consumers are paying. Prices in general, however, are easier. In outlying territory west of Cleveland the base price is $32 to $33, and if there were no railroad obstructions the iron could be shipped into Cleveland at $34.27. However, as high as $36 still is being paid here though this is exceptional, due to the urgency of the requirement. One Cleveland maker is quoting $34, base, for shipment outside the district, and $35 for shipment in Cleveland. Another maker is quoting iron at $35 to $36, and in the week booked 500 tons at $35 for a consumer near Cleveland. Prices are largely nominal, as buyers are refraining from purchasing in the hope of lower figures, and there is an absence of sizable offerings to test the market. The total of sales by the northern Ohio group of furnaces in the week, all grades, does not exceed 4000 tons. The 500-ton lot referred to is the largest individual sale of the week. Makers could ship twice as much iron as they are doing if they had the cars. Consumption is somewhat spotty, shippers to Indiana reporting a falling off in the melt, and the same condition in certain portions of Ohio. Southern Ohio iron is offered here at $32, Ironton. Inquiry is very quiet. The Worthington Pump Co. is asking for prices of 1650 tons of foundry iron, and another eastern consumer is in the market for 700 to 800 tons of foundry iron. One maker is quoting $31 to $32 on inquiries for the first quarter, but has not booked tonnage.

The market for basic remains quotable at $32, though no transactions are reported since the sale of 5000 tons at that figure by a Cleveland interest last week. A northern Ohio consumer is understood recently to have sounded the market on 10,000 tons of basic.

Buying at Low Ebb

Cincinnati, Oct. 10.—The car shortage is holding back the pig iron market in the South. Some delayed shipments are going forward and considerable tonnage sold for third quarter delivery is moving since a number of cars tied up on sidings for several weeks have been received in this district during the past few days. However, in all but limited tonnage is being shipped from the furnaces. As a result producers are booking cautiously and furnace stocks are accumulating. Reports indicate that the Tennessee furnaces have been somewhat better supplied with cars than those in the Alabama field. Shipping conditions are better in southern Ohio but pig iron stocks there are so low that little new business is being booked. Only two furnaces are aggressively in the market and they are experiencing but little difficulty in making deliveries on new business.

Few sales are being made in this district, most recent orders being for carload lots and there is practically no inquiry. In spite of small furnace stocks and minimum production, the southern Ohio market appears a little soft with a decline in current quotations. Furnaces with available iron are quoting $33 to $34, base, Ironton. In the South, while there still is available considerable resale iron around $27 and $27.50, furnace prices are firm at $30 for prompt delivery and a range from $28 to $30, Birmingham, for delayed shipments.

Shipments More Difficult

Buffalo, Oct. 10.—Pig iron producers in this district are experiencing grave difficulties this week in making shipments. They say that price is a secondary consideration with foundries that want iron but say that it is practically impossible to make satisfactory shipments on account of shortage of cars and embargoes. The going price is $31 to $32 for No. 2 plain (1.75 to 2.25 silicon). For under 1.75 silicon, one furnace is making a price of $31.50. No. 2X (2.25 to 2.75 silicon) is $32 to $33 and No. 1 X (2.75 to 3.25 silicon) $33 to $34. Inquiry is fair but sales are not up to average. One maker reports 8700 tons of inquiry, including one for 1000 tons. One furnace has practically retired from the market. Twelve furnaces are blowing in this territory.

Foregn Iron Still Low

Boston, Oct. 10.—After the slight softenin- in price a week ago consumers are gradually regaining confidence in the future firmness of pig iron prices, and inquiry again is increasing. Stocks in producers' hands are almost nil, and consumers' stocks are far below normal for this time of year. Movement of freight is already being somewhat retarded, and the approach of winter does not offer hopes of any better servce. The fuel problem is making it difficult for eastern furnaces to get in blast. Eastern Pennsylvania iron is freely offered at $32, furnace, or $35.65, delivered New England, with differentials of $1. In some cases the differential for silicon 2.25 to 2.75 iron is being waived. Buffalo No. 2X (2.25 to 2.75 silicon) is offered at $32, furnace, or $36.91, delivered, which makes it out of line with the competition of eastern Pennsylvania. However, deliveries from Buffalo to northern New England points have been prompt enough to command a good many orders. Southern iron at $28, furnace, is about in line with Buffalo iron as to delivered price in central New England, and several sales during the

week have been reported. Foreign iron is still the lower seller with Scotch iron of silicon above 2 per cent offered at $30, c.i.f. Boston. Sales during the week have been mostly for small tonnages, the largest reported being 500 tons. An eastern Massachusetts melter is in the market for from 1200 to 1500 tons of different grades, a Vermont consumer for 150 tons of three grades, and a New Hampshire consumer for malleable.

Off-Basic Is Sold

Youngstown, O., Oct. 10.—A sale of approximately 1000 tons of off-basic iron was consummated today by a steelworks furnace at $32, valley, for shipment out of the district.

Market Strong In South

Birmingham, Ala., Oct. 9.—Pig iron sales have been made in the last few days in the Birmingham district at $30 for No. 2 foundry. The companies now selling in the market are looking for spot business rather than for contracts. Two interests are out of the market entirely and are striving to catch up with their commitments before Jan 1. Two other interests are selling cautiously. The stand of the market is $28 to $30. Production shows an increase because of the large output of the furnace at Ensley which was blown in recently. Three blast furnaces are scheduled to resume operations during the coming month. Railroad service has improved. Inquiries are coming in for 1923 but all companies with one or two exceptions announce that their books are not open. No market price has been fixed. Inquiries are coming from every direction. The barge line out of Sheffield-Florence is getting steady traffic, pig iron in quantity being taken into the St. Louis territory via Metropolis, Ill. While all railroads have lifted embargoes Cincinnati, Louisville, Chicago, St. Louis and other centers are reporting delays in deliveries in iron from the South.

Business Fair at St. Louis

St. Louis, Oct. 9.—A few inquiries were received here during the week for first quarter, first half and even third quarter delivery in pig iron. Nearly all consumers are buying only for prompt shipment and a fair volume of business is being done. A general foundry bought 1000 tons of southern iron for water and rail shipment from the Sloss-Sheffield Steel & Iron Co., which has been specializing on this method of transportation. This is about all the southern iron that is coming through, because of the rail congestion. The market for southern iron ranges from $27.50 to $30, Birmingham. Northern iron is still at $32, Chicago. The Granite City maker sold several thousand tons of basic to one East Side melter and several thousand tons of foundry iron to another East Side concern. The melt keeps up, and all of the foundries in St. Louis, the East Side and other parts of the district are busy.

Plans for reorganization of the Templar Motors Co., Cleveland which went into bankruptcy recently, are being formulated. The plant is in receivership and it has been closed for inventory. Resumption of operation will take place within two weeks, however, according to the receiver.

Develop Lower Coke Price

Furnace Companies Find Beehive Fuel Available at $11 to $12—Production Increasing—Car Supply Improves

COKE PRICES, PAGE 960

Pittsburgh, Oct. 10—Lower prices of beehive coke expected for some time by various interests have been developed in recent purchases by blast furnace companies. Increased production has had some influence in bringing this about, but coke apparently is being brought more into a comparable position with coal. The spread still is high since Connellsville mine-run seam coal has sold in fairly large quantities this week at $3 and by-product coking coal is quoted at a minimum of $4. The Pittsburgh Steel Co. recently purchased 5000 tons of furnace coke at $12, but a tonnage for delivery over a certain period was sold to a Shenango valley user in the past week at $11. The market on 48-hour fuel, therefore, cannot be quoted above $11 to $12, whereas the middle of last week this grade was quoted as high as $13 per ton. Heating coke and medium-sulphur furnace coke is quoted at $10 to $10.50. Demand for the furnace grade still is high and the Pittsburgh Steel Co. and the Shenango Furnace Co., each with two furnaces in operation, are avenues readily available for the disposal of furnace coke at reasonable figures. A number of furnace operators like the McKeefrey Iron Co., American Manganese Mfg. Co. and two or three others located in the East are waiting for still lower coke prices before they blow in their furnaces. The Brier Hill Steel Co. and a few other valley consumers are said to be in the market. The Sharon Steel Hoop Co. is reported to have covered a portion of its requirements. Foundry coke now is selling at $13 to $14, whereas late last week various sales were consummated at $14 to $15, ovens. The maximum figure applies to a few 2-carload lots. Inquiries are plentiful for 72-hour fuel although tonnage arrangements are lacking and spot transactions alone feature the market. The car supply in the lower Connellsville region is improving considerably, although in other sections car shortages still are noted. Producton, according to the *Connellsville Courier*, for the week ended Sept. 30 was 118,680 tons as compared with 105,340 tons the preceding week.

Foundry Coke $13.50 to $14

Philadelphia, Oct. 10.—The market for foundry coke here is strong, varying from $13.50 to $14, Connellsville.

English Coke Arrives

New York, Oct. 10.—The first cargo of English foundry coke to arrive in New York harbor since 1901 was received last week by E. Arthur Tutein, Inc. The cargo involved 5400 tons of English by-product foundry coke. The cargo practically has been unloaded and is being sold to the foundry trade for immediate shipment at $14 to $15 c.i.f. Offerings of standard foundry coke continue restricted. Some standard Connellsville foundry coke continues obtainable at $13.50, ovens, and the usual market is $13.50 to $14, although as high as $15 is asked for some brands. The Seaboard By-Products Coke Co. continues to quote $14, ovens, on by-product foundry coke but is shipping only on its contracts and is not taking new business. A sale of standard Connellsville furnace coke has been made at $12, Connellsville.

Coke Supply Is Easier

Boston, Oct. 10.—While the coke situation for the winter still is uncertain, the immediate supply is easier, and spot sales at high prices are far less frequent than a week ago. The two local producers still quote $16.50 as their delivered price for contract foundry coke. Foreign coke for prompt delivery is offered at $17 to $18, and Connellsville coke at close to $19, delivered. Shipments of by-product coke have improved.

Foundry Coke Sold at $15

Cincinnati, Oct. 10.—Conditions which have hampered coke production are improving but shipments still are being delayed and there is at the moment a subnormal demand. Inquiries have been increasing but they are for limited tonnage. Connellsville foundry sold here this week up to $15, ovens, and that figure is being quoted against some current inquiries. Schedules are being firmly maintained on all grades, except that fractionally lower prices are quoted on Wise county furnace fuel.

Boston Buys in South

Birmingham, Ala., Oct. 9.—The coke market in the Birmingham district is still strong, prices ranging from $8 to $9.50 on foundry fuel. Car supply is improved, but still there is not more than 70 per cent coke production. The principal feature of the market has been negotiations for 5000 tons of by-product coke a month to be shipped by the Sloss-Sheffield Steel & Iron Co., to Boston, to be disposed of there in the municipal yards. The mayor of Boston conducted the negotiations with the company. The company has more than 200,000 tons of coke on its yards at North Birmingham. The Boston authorities have arranged for the transportation of the coke to Charleston and thence by boat to destination. No intimation is given here that there will be any reduction in coke prices in the near future.

Output at St. Louis Increased

St. Louis, Oct. 9.—The outstanding feature of the coke market here is the increased production of the St. Louis Coke & Chemical Co., which had been out of the market. Because of the heavier receipts of coal the company is now able to supply coke needed by consumers in this territory. The price is $14, ovens. The price of Connellsville coke also is $14, ovens, and the movement is better, although still slow.

Routine business was transacted at the regular meeting of stockholders of the Midvale Steel & Ordnance Co., Oct. 3. All retiring directors were reelected.

Bar Demand Is Unabated

Additional Tonnages Are Being Placed for Delivery at Mills' Convenience—Orders Come from Customers in All Lines

BAR PRICES, PAGE 960

Chicago, Oct. 10.—Inquiry from consumers of soft steel bars has not been abated and mills in a position to take on additional business are doing so at a heavier rate than for several months past. This business is being placed for delivery at mill convenience and for the most part no promise of a definite time is being made. Bars are quoted 2.00c to 2.10c, Chicago mill, while a smaller independent producer has been able to obtain 2.50c, Chicago, on attractve business for prompt delivery. An eastern producer has sold some soft steel bars into Chicago territory at 2.25c, Pittsburgh, while another eastern maker occasionally has bid slightly under this figure.

Demand for bar iron is light and not sufficient to keep mills busy, lack of buyng by railroads taking the backbone out of the market. The price contnues steady at 2.50c, mill, in spite of slack demand. Cost of production prevents this figure being shaded.

Rail steel bars are available at 2.00c, mill, and are in good demand.

Orders Fairly Voluminous

Pittsburgh, Oct. 10.—Merchant steel bar orders continue to be received by the mills here in fair volume from diversified sources. More bars are being bought than other forms of finished steel. Shafting producers, railroad car manufacturers, automobile interests, all are furnishing their quotas with smaller tonnages being bought by agricultural implement makers and other lines. While deliveries have been held up during the past week or 10 days on account of railroad embargoes, shipments probably will resume this week on the Pennsylvania lines. This with the car shortage has caused some piling of steel although much caution has been exercised in this connection to avoid repeating experiences of 1920 when such large tonnages of steel had to be remelted since identities, etc., were lost. Specifications against contracts have been heavy. Prices are quoted 1.90c to 2.25c although the 1.90c figure is not available to the spot buyer but is being made by one large independent interest as well as the Carnegie Steel Co. to certain of its larger customers. Both of these interests have a 2.00c price for smaller lots. Refined iron demand is improving but the price remains unchanged and firm at 2.60c, base Pittsburgh.

Good Tonnages Placed

Buffalo, Oct. 10.—Steel bar mills are taking on good tonnages, but are making deliveries accommodate rollings. The market price is 2.00c, Pittsburgh.

Demand Fairly Active

New York, Oct. 10.—Fairly active demand features the steel bar market and substantial tonnages are being sold. They include the fourth quarter requirements of some large consumers. Most of this business has gone at 2.00c base Pittsburgh. Some went at 1.95c. Where prompt shipment is wanted it is easy to obtain 2.10c. Some carload sales of iron bars have been made at 2.15c base Pittsburgh.

Demand Holds Up

Boston, Oct. 10.—Demand for steel bars continues strong in New England. The gradual reduction in orders for concrete bars in anticipation of the winter months is being made up by increases in soft steel bars. Most interests are asking 2.15c to 2.25c, Pittsburgh, although some recent sales have been at 2.10c. One order for 500 tons is reported.

Demand Is Strong

Cleveland, Oct. 10.—New business in bars is better than in most other finished products and continues to come from a wide variety of sources. Automobile parts manufacturers have been taking some tonnage, one closing for 200 tons of forging quality and another lot of 750 tons is pending. Independent mills are quoting around 2.00c and the leading interest $1 to $2 lower. The Carnegie Steel Co. named 1.95c Pittsburgh on a tonnage of bars for the Big Four railroad for fourth quarter delivery.

Nearby Demand Brisk

Philadelphia, Oct. 10.—The steel bar demand continues brisk, mostly for nearby. The usual price is 2.00c Pittsburgh with some sales higher. Special business brings out 1.95c and occasionally 1.90c Pittsburgh. Forging bars are quoted at 2.25c to 2.50c Pittsburgh. The mills generally are not inclined to solicit forging bars due to the extra labor required on them. All mills feel the labor shortage. It is difficult to get iron bars under 2.15c Pittsburgh. There have been some carload sales at this figure.

Distribution Still Difficult

Pittsburgh, Oct. 10.—While a slight improvement is noted in deliveries of steel to the cold-drawn bar producers the supply is unbalanced and distribution of the finished product continues difficult. Automobile trucks help out to a certain extent but without adequate railroad transportation, operations are measurably curtailed. Around 40 per cent is perhaps the average operation possible at present although this may be improved before the end of the week. Although some exploitation of the situation is going on and prices up to 3.00c have been demanded and obtained on prompt deliveries, the market as quoted generally still is 2.50c to 2.75c, base Pittsburgh. An advance of $5 or $10 per ton at an early date, however, is probable.

Bolt, Nut, Rivet Orders Still Are Heavy

NUT AND BOLT PRICES, PAGE 1020

Chicago, Oct. 10.—Demand for bolts and nuts continues strong and some makers have booked sufficient to cover capacity operation practically through fourth quarter. It is apparent most regular customers have closed for their entire requirements and that users have sufficient orders on mill books to see them through to the end of the year. Prices are strong.

Order Receipts Fairly Good

Pittsburgh, Oct. 10.—Order receipts on nuts, bolts and rivets during the past two weeks have been heavy although the majority of the specifications placed are at figures based on discounts prior to Sept. 27. These involve a saving of 5 to 10 per cent, small machine bolts now being quoted at 60 and 5 off as against 60 and 10 off formerly; small carriage bolts being quoted at 50, 10 and 5 off instead of 50, 10 and 10 off. Hot-pressed and cold-unched square and hexagon nuts, blank or tapped, are quoted at $3.50 off list here as against $3.25 off list in the Cleveland territory. In the latter district lag screws are quoted at 60 and 5 off while local producers name 50 and 10 off. Apparent discrepancies also exist for the time being between the two territories on rivets. While in the Cleveland district, ½-inch and larger rivets were advanced slightly to 3.15c and 3.25c, base Pittsburgh, respectively, for structural and boiler rivets, local prices are unchanged at 3.00c and 3.10c, respectively. During the past week a tonnage involving several carloads of structural rivets to a railroad company developed an even lower figure and it is understood that the order was booked at 2.90c.

Demand Still Is Strong

Cleveland, Oct. 10.—Bolt and nut demand continues strong although specifications have not been as heavy this week as last. However orders and specifications are fairly heavy and makers are constantly striving to increase plant operations although this is somewhat difficult in the face of raw material supplies being held up by delayed shipments. The new prices are being firmly held.

As with bolts and nuts, rivets specifications are not as heavy as a week ago. The maker here is holding to the prices established a week ago although it is understood Pittsburgh producers still are quoting the old levels.

New Hoop Orders Small

HOOP PRICES, PAGE 960

Pittsburgh, Oct. 10.—Hoop and band mills largely are obligated for their output to the end of this year but specifications are in hand for only between 30 and 60 days ahead. New business is limited, an order for a carload or two being noted now and then. Some of the hot-rolled strip steel mills claim 3.25c easily is obtainable on their narrow sizes and thin gages, and as high as 3.50c has been quoted. The regular market price of hoops and bands, however, is 2.90c, base Pittsburgh.

Iron Ore Trade Quiet

ORE PRICES, PAGE 1020

Cleveland, Oct. 10.—The Lake Superior iron ore trade is quiet, and

after surveying the market shippers do not expect anything additional of importance in sales to develop this year. Shipments are being retarded by railroad embargoes, but no complaints are being received from consumers, who appear to be well stocked. Receipts of ore at Lake Erie ports, shipments therefrom, and the balance on docks Oct. 1 were as follows:

Port	Receipts	Shipments	Balance on dock, Oct. 1
Buffalo and Port Colborne, Ont..	2,927,041	196,652	282,302
Erie	450,092	439,280	462,084
Conneaut	4,917,050	4,628,761	1,790,004
Ashtabula	5,853,115	5,387,012	2,876,760
Fairport	899,402	720,117	429,660
Cleveland	5,434,751	3,079,691	1,713,084
Lorain	2,074,900	804,783	388,979
Huron	473,222	370,957	781,449
Toledo	872,877	476,219	304,386
Total Lake Erie	23,902,450	16,103,472	9,028,708
Comparative total, one year previous	13,078,054	9,569,727	9,661,365

Selects Coal Commission

Car Shortage Grows

Washington, Oct. 10.—President Harding has appointed the following to the federal coal fact-finding commission: John Hays Hammond of Washington; Thomas R. Marshall, former vice president; Judge Samuel Alschuler of Chicago; Clark Howell of Atlanta; George Otis Smith of Washington; Dr. Edward T. Devine of New York; and Charles P. Neill of Washington. The commission is to meet within 10 days to select its chairman and to plan procedure. Mr. Smith is director of the geological survey; Mr. Howell is editor of the Atlanta *Constitution;* Judge Alschuler was arbiter in the packing house labor difficulties at Chicago; Mr. Neill was commissioner of labor under President Roosevelt and now is manager of the bureau of information of southeastern railways; Dr. Devine is writer on social and economic subjects and formerly was editor of the *Survey* and Mr. Hammon a noted mining engineer.

The sortage of freight cars was accentuated in the last eight days of September with a daily average surplus of only 5843 and daily average shortage of 130,325 cars. Revenue freight loading in the last week of September was 988,381 cars, a gain of 15,000 over preceding weeks. The American Railway association is expected to ask carriers to reserve for the steel trade all mill type gondolas. This may help its situation by adding several thousand cars to the available supply.

The Chamber of Commerce of the United States says a survey of coal stocks east of the Mississippi north of the Ohio reveals public utilities and general industries with a 45-day supply and by-product coke and steel works fairly well supplied.

Raises Tin Mill Wages

Included in the list of nonunion tin plate producers which advanced tin mill wages following the recent general increase by the Steel Corp., is the McKeesport Tinplate Co., McKeesport, Pa. Its hot mill tonnage workers have been increased 10 per cent and tinners 15 per cent. Common labor was raised 20 per cent to 36 cents per hour.

Railroads Buy Most Plates

Repair Lots Placed in East or On Inquiry Aggregate Considerable Tonnage—Car Buying Continues To Take Round Lots

PLATE PRICES, PAGE 960

Chicago, Oct. 10.—Continued buying of railway cars and occasional lettings of oil storage tanks keep the market for steel plates active, especially in view of the large commitments held by most mills. Letting of more than 4000 freight cars during the past week brings to Chicago mills something less than 40,000 tons of plates, in addition to the bars and shapes required for this equipment. While the leading producer is willing to take additional plate tonnage at 2.10c, Chicago mill, the independent plate mill is obtaining 2.30c, mill, for universal plates for fairly early delivery. Bids are being considered by the Sinclair Oil Co. for 10 storage tanks of 80,000 barrels capacity each, which will require about 3000 tons of plates.

Orders Booked at 2.00c to 2.10c

New York, Oct. 10.—A number of leading consumers placed plate orders in the past week, generally for spot and nearby shipment. Some current business is being taken at 2.25c, base Pittsburgh, but this figure now is maximum. Attractive single lots are going at 2.00c to 2.10c, base Pittsburgh. The 1.95c base Pittsburgh price can be done where a buyer does not expect quick shipment. The Federal Shipbuilding Co. is now the low bidder on five steel barges for the New York Central railroad. This company quoted $53,960 on the first barge, with substantial discounts on each additional barge.

Market Has Easier Tone

Cleveland, Oct. 10.—An award of lock bar pipe requiring 1800 tons of plates for an extension of a water line to the Baldwin reservoir has been awarded by the city to Peter F. Connelly. About 1500 tons of stills and other oil field work in three or four lots remain pending. Otherwise the market shows less activity and this is reflected in keener competition for business with some easing of prices. Some independent mills now will do less than a week or so ago. The full range of the market is 1.90c to 2.25c with the latter applying to quick shipment. On bids received by the Big Four railroad this week on 1500 tons for fourth quarter the Carnegie Steel Co. was low at 1.95c Pittsburgh. Other bids were Otis Steel Co. 2.25c Pittsburgh; Worth Steel Co. 2.35c Pittsburgh; Midvale Steel & Ordnance Co., 2.20c Pittsburgh; Jones & Laughlin Steel Co., 2.25c Pittsburgh; Inland Steel Co., 2.30c Indiana Harbor, and Illinois Steel Co., 2.195c Kankakee, Ill.

Railroads Buying Heavily

Philadelphia, Oct. 10.—The principal buying of plates in this district has been by the railroads. The Norfolk & Western and the Seaboard both have bought heavily and are taking more. The Chesapeake & Ohio opened bids Monday on a big tonnage and the Baltimore & Ohio is inquiring for several hundred tons. The Philadelphia & Reading has been buying steadily and the Pennsylvania is inquiring for 2000 to 5000 tons for first quarter. The Baldwin Locomotive Works continues as an active buyer of locomotive plates. Demand is fair but in a smaller volume than recently. Some current business has been at 2.25c Pittsburgh but most of it has been at 2.00c to 2.10c and some at 1.95c, Pittsburgh.

Buying Interest Is Low

Pittsburgh, Oct. 10.—Interest is low in connection with plates, with respect to specifications and inquiries. Only small orders are received. One or two tank inquiries are pending, action being deferred on new tanks as long as deliveries on old ones cannot be made satisfactorily. A few jobs involving 200 or 300 tons of plate work each are before fabricators and some similar tonnages are pending from boiler makers. The Jones & Laughlin Steel Co. is building four steel barges for the Inland Transportation Co., Louisville, Ky., which require approximately 800 to 1000 tons of plates to be furnished at its plate mill. Sheared plated are quoted at 2.00c to 2.25c although on small tonnages the spread is 2.15c to 2.25c.

Unfilled Bookings Gain

Unfilled bookings of the United States Steel Corp. as of Sept. 30 with an increase of 741,502 tons registers the largest advance since Jan. 31. The figures show the total unfilled tonnage at the end of the month is 6,691,607 tons. This is the largest monthly tonnage since February, 1921. Comparisons follows:

Date	Total	Change, tonnage	Change, per cent	
Sept. 30, 1922...	6,691,607	741,502	+12.4	+
Aug. 31, 1922...	5,950,105	173,944	+ 3.01	+
July 31, 1922...	5,776,161	140,630	+ 2.48	+
June 30, 1922...	5,635,531	381,303	+ 7.2	+
May 31, 1922...	5,254,228	157,311	+ 3.08	+
April 30, 1922...	5,096,917	602,769	+13.4	+
Mar. 31, 1922...	4,494,148	353,079	+ 8.5	+
Feb. 28, 1922...	4,141,069	100,609	— 2.367	—
Jan. 31, 1922...	4,241,678	26,736	— 0.0062	—
Dec. 31, 1921...	4,268,414	17,872	+ 0.004	+
Nov. 30, 1921...	4,250,542	36,287	— 0.84	—
Oct. 31, 1921...	4,286,829	273,841	— 6.004	—
Sept. 30, 1921...	4,560,670	28,744	+ 0.63	+
Aug. 31, 1921...	4,531,926	298,398	— 6.3	—
July 31, 1921...	4,830,324	287,544	— 5.59	—
June 30, 1921...	5,117,868	364,619	— 6.2	—
May 31, 1921...	5,482,447	362,737	— 6.2	—
April 30, 1921...	5,845,224	439,541	— 6.8	—
Mar. 31, 1921...	6,284,765	649,102	—10.32	—
Feb. 28, 1921...	6,933,867	639,207	— 8.21	—
Jan. 31, 1921...	7,573,164	574,958	— 7.59	—
Dec. 31, 1920...	8,148,122	873,359	— 9.68	—
Nov. 30, 1920...	9,021,481	815,371	— 8.26	—
Oct. 31, 1920...	9,836,852	537,952	— 5.16	—
Sept. 30, 1920...	10,374,804	430,214	— 3.56	—
Aug. 31, 1920...	10,805,038	313,430	— 3.4	—
July 31, 1920...	11,118,468	139,651	+ .7	+
June 30, 1920...	10,978,817	38,751	+ 0.35	+
May 31, 1920...	10,940,466	580,719	+ 5.6	+
April 30, 1920...	10,359,747	467,672	+ 4.51	+
Mar. 31, 1920...	9,892,075	389,994	+ 3.94	+
Feb. 29, 1920...	9,502,081	216,640	+ 2.3	+
Jan. 31, 1920...	9,285,441	1,020,075	+11.00	+

The Art Metal Construction Co., Jamestown, N. Y., has declared the regular quarterly dividend of 25 cents a share, payable Oct. 31 to stock of record Oct. 13.

Scrap Activity Subsides

Buying Falls off and Embargo Contributes to Dullness—Inquiries for 50,000 Tons of Heavy Melting Steel Appear in East

SCRAP PRICES, PAGE 1024

New York, Oct. 10.—More than 50,000 tons of heavy melting steel is on inquiry in this district, including substantial tonnages for Bethlehem and Johnstown, Pa. Borings and turnings are also in excellent demand, and, all in all, the market looks stronger than in two or three weeks. Prices on heavy melting steel and No. 1 railroad steel have advanced 50 cents to a range of $14 to $14.50, f.o.b. New York, and $14.75 to $15.25, respectively. Machine shop turnings and mixed borings and turnings are also up 50 cents, holding at $11.75 to $12.25. Wrought pipe has advanced $1, to a range of $12.75 to $13.25.

Other Districts Buying

Buffalo, Oct. 10.—Outside demand for scrap temporarily is foreshadowing the local trade. Dealers have been shipping substantial tonnage into Youngstown and other districts. With a $2.90 freight rate to Youngstown from Buffalo, prices equal to $23 have been realized on shipments to points in that district. Most of the trading here is being done by dealers, steelworks being loath to pay over $19.50 for heavy melting steel. Borings, turnings and low phosphorus are in brisk der ıd.

Embargo Period Dull

Pittsburgh, Oct. 10.—During the period scheduled to end tomorrow night when deliveries of scrap on the Pennsylvania lines were held up on account of the road's embargo, scrap sales have been virtually nil. The embargo did not apply to deliveries of the Pennsylvania's own scrap awarded on recent lists to dealers, mainly in the Youngstown territory, where some high bids were recorded in an effort to cover shorts. These transactions represent practically the only activity in scrap circles. Producers will not sell as long as deliveries cannot be made and consumers will not buy in view of the present high prices. The Jones & Laughlin Steel Co. with 10 blast furnaces out of 12 active, is not buying scrap and the Pittsburgh Steel Co. which has just added another blast furnace, is out of the market for the time being but may have to buy within a week or two. Heavy melting steel still is quoted at $21.50 to $22, however, with numerous users claiming they cannot pay such high figures. A recent sale of No. 1 cupola cast where the material had to be selected for size was consummated at $25 but the regular market price is up 50 cents to $23.50 to $24. Recent sales of low phosphorus billet and bloom crops carry the quotation on this grade up to $25 to $26, while iron car wheels have brought as high as $24 and consequently are marked up 50 cents.

Scrap Quiet but Firm

Cincinnati, Oct. 10.—Following the trend of pig iron, scrap is quiet and while there is scarcely sufficient trading to establish actual prices, schedules are unchanged and the market is firm. Steel mills continue to take some tonnage but their requirements have declined and they are not buying far ahead. Unfilled orders are being taken care of better than for a long time and general conditions continue to improve. At the present level considerable tonnage is being sent to this market by country dealers but just at this time there are no lists of importance before the trade. Southern railroads report heavy accumulations and are preparing lists but there is little prospect that any of this tonnage will reach the market until well toward the end of the year.

Trading Dull at Chicago

Chicago, Oct. 10.—With an unusually small supply of scrap coming out and most buyers well covered, the market is unusually quiet. While consumers are not seeking further supply, they are ready to take spot cars when offered, at present prices. Cars are difficult to obtain, and this is hampering shipments materially. Malleable scrap is in better demand than other grades and is at a premium. Steel grades are being bought steadily as offered, but consumers have sufficient

(Concluded on Page 975)

Semifinished Prices Firm

Minimum on Sheet Bars, Billets and Slabs Held at $40—Heavy Tonnage Carried Over Delays Announcement for Fourth Quarter

SEMIFINISHED STEEL PRICES, PAGE 960

Pittsburgh, Oct. 10.—While quotations up to $45 per ton are reported current, the going market on sheet bars, 4 x 4-inch and smaller rerolling billets and open-hearth or bessemer slabs, is $40, Pittsburgh or Youngstown. Several mills have obligated their fourth quarter output at that figure and those who have not are carrying over such large tonnages from the third quarter that they have none to offer. This explains the lack of price announcement on semifinished material for the fourth quarter by the Carnegie Steel Co.

As high as $50, Pittsburgh, frequently is obtained on billets of forging quality. Several consumers here in the past three weeks have closed on tonnages of various size at that figure. Lower prices are being made elsewhere, particularly in the East, where $45, Pittsburgh, has been done. A lack of new business is noted but undoubtedly if lower prices were available some sizable tonnage would be placed, since many mills cannot convert $40 material profitably.

Wire rod orders involve varying tonnages, depending upon the extent to which the mills can take them. Often it is necessary to reserve the rods for their own finishing departments. From $45 to $50 are reported in the way of quotations, with the bulk of the tonnage booked at $47.50, Pittsburgh. Skelp activity is confined to deliveries on contracts. No new inquiries are noted but quotations range from 2.00c to 2.25c, base Pittsburgh.

New Tonnage Not Available

Youngstown, O., Oct. 10.—Producers of semifinished material have no tonnage available for the open market. Mills are confining rolling schedules to specifications against contracts and hesitate to increase commitments, their output of steel over the remainder of the year being covered. In the absence of any new sales, sheet bars, billets and slabs are quoted at $40, Youngstown.

Sold Up For Quarter

Cleveland, Oct. 10.—The leading maker of semifinished material in this district is sold up to the end of the quarter, and is not booking tonnage for the fourth. No tonnage was taken during the week. The price on sheet bars, billets and slabs here remains quotable at $40, Pittsburgh and Youngstown. Some inquiry for forging billets including one lot of about 750 tons for automobile parts remains current in this district.

Eastern Consumers Buy Billets

New York, Oct. 10.—Several thousand tons of rerolling billets for shipment over the next couple of months have been closed by consumers in this district during the past week. Most of the business apparently was placed at $40, base Pittsburgh. Some moderate sized lots of forging billets have been placed at $45 to $47.50, base Pittsburgh. Owing to the effect of the railroad congestion, not many mills are anxious to book billet business. On 200 tons of forging billets on which the New York Central opened bids last week, there were only two bids. The Alan Wood Iron & Steel Co. bid $50.79, Newberry Junction, Pa., and the Bethlehem Steel Co. bid $51.03, West Seneca, N. Y.

The supply of wire rods again is restricted owing to inability of the western makers to ship. The railroad embargoes have forced the mills to accumulate big stocks and in some cases restriction of production has been necessitated. The rod market continues to be quoted at $45 to $47.50, base Pittsburgh.

Wire Rods Scarce

Philadelphia, Oct. 10.—Some billet business has been closed here at $40 per ton. Rerolling billets are $45 to $47.50. The supply of wire rods continues inadequate. They are quoted at $45 to $47.50.

Warehouse Demand Still Heavy; Prices Firm

WAREHOUSE PRICES, PAGE 1016

Cleveland, Oct. 10.—Depletion of stocks in iron and steel warehouses in this district is causing the present month's volume of business to fall behind that of the September and August. However, demand is just as strong as it

was during those periods. Shipments from mill are being held up by the car shortage. A sheet jobber reports that a shipment which left the mill in Wheeling, W. Va., on Sept. 1 did not arrive at the local warehouse until Oct. 2. However, the same jobber on Sept. 30 ordered a carload from the same mill and was in receipt of it Oct. 5. Prices are being held at the established levels.

Market Is Steady

New York, Oct. 10.—The local warehouse market continues steady, no change in price being reported in any description. Demand is holding up well, but is not of the volume of a month ago. Jobbers are having difficulty getting material from the mills due to transportation difficulties, but are not being affected in outgoing shipments.

Heavy Demand Reported

Philadelphia, Oct. 10.—Jobbers in iron and steel products in this district report demand during the past two weeks has been equally as large as at any time in 1920. Most business was of the regular character although some of it represents emergency demands due to railroad embargoes. Prices are unchanged.

Can Makers

Enter Market for Additional Tin Plate —Higher Prices Expected

TIN PLATE PRICES, PAGE 960

Pittsburgh, Oct. 10.—Container manufacturers at times find themselves under the necessity of placing additional tin plate orders. Tonnages are not always obtainable when wanted. One order for 35,000 base boxes was offered to four or five of the largest tin plate producers in this territory last week by a canmaker but because December deliveries only were available the order is understood to have been placed in the Wheeling district for shipment during November. Other instances of a similar character are noted from week to week. Offers have been made by consumers to place orders for delivery during the first quarter of next year but most of these are being turned down. One of the latest involved 275,000 base boxes. A few such orders have been written on the books subject to a price to be announced later for that period. The market continues quotable at $4.75 per base box of 100 pounds, Pittsburgh, but since tin plate is practically the only steel product that has not advanced, producers as well as buyers alike anticipate an early advance of $5 or $10 per ton. With a tin bar price of $40 per ton to many conversion mills, as against $30, the price when tin plate first was sold at $4.75, a difference of $10 per ton is noted, which with $2 per ton, the difference in the scrap value, and an increase of labor of 20 cents per base box, tin plate is costing 80 cents per base box more to produce now than when the $4.75 base price first was named. Operations have been interfered with by the transportation situation but relief is expected later in the week. At the moment the American Sheet & Tin Plate Co. is operating 59 per cent of its hot mills with the balance in favor of sheet units, and the average among independents generally is slightly above 75 per cent. No relief in the car shortage is noted.

Sheet Orders Still Heavy

Slight Improvement Noted in Transportation Facilities—Higher Extras Put in Effect by Some Makers—Prices Show Spread

SHEET PRICES, PAGE 960

Youngstown, O., Oct. 10.—While the transportation situation pertaining to sheet steel shipments has improved slightly, the condition still is acute at some mills where operation is being conducted on a 50 per cent basis. According to careful estimates about 20,000 tons of various grades of sheets are piled on warehouse and mill floors for want of closed cars. At some plants sheets are being shipped in gondolas with a temporary roof attached. Certain sheetmakers with plant equipment suitable for the production of fine-finish grades have revised extras for miscellaneous treatment on a higher basis. On single pickled, cold-rolled and annealed stock an extra of 60 cents per 100 pounds now is quoted, while on full pickled, cold-rolled and reannealed an extra of 80 cents applies. As far as can be learned, only one maker of common sheets in this district has adopted the new extras. The volume of sheet business being placed shows no signs of diminishing. Some mills are booked eight weeks ahead while others will not extend their commitments beyond 30 days. Prices show a spread of $5 a ton. Some makers are quoting black at 3.50c, base, Pittsburgh, and one at 3.75c. Where specifications were attractive, one maker of galvanized accepted tonnage at 4.50c. The majority of galvanized producers are quoting 4.60c, base, Pittsburgh, although 4.75c is being asked by two makers. Blue annealed continues quotable at 2.75c.

Higher Extras Maintained

New York, Oct. 10.—Demand for sheets is restricted here to spot and nearby requirements. Prices show some variation. Some of the sheetmakers who are unable to offer deliveries under eight to 10 weeks have minimums of 2.75c, base Pittsburgh, for blue annealed, 3.75c for black and 4.75c for galvanized. They report fair bookings at these prices. It is difficult to place blue annealed sheets anywhere under 2.75c. On black sheets some mills will take attractive business at 3.50c, base Pittsburgh, while others are quoting 3.50c on the heavier gages and want 3.75c for the 24-gage and lighter. It is easy to place galvanized sheets at 4.50c. A factor in sheet prices is the lack of assurance on the part of some of the mills not located in the East as to the extent the car shortage will continue to hinder them in making shipments. The higher extras for full-finished sheets are being maintained. Single pickled black sheets, on which the extra was 40 cents for 100 pounds, now are bringing the 60-cent extra. Various makers are obtaining an 80-cent extra on full-pickled sheets and proportionate advances on other finished sheets.

Eastern Market Strong

Philadelphia, Oct. 10.—The sheet market here is strong and active, especially for prompt material. Some contracting is being done for the fourth quarter. Blue annealed generally is 2.75c, Pittsburgh, and 2.60c now is exceptional. Black is 3.50c, and galvanized 4.50c, although some makers are asking higher prices on black and galvanized.

Miscellaneous Extras on Sheets Advanced

Increases of 10 to 25 cents per 100 pounds in the standard miscellaneous extras on sheet and tin mill products have been put into effect recently by a number of independent mills. The new list was put in effect by a number of the mills Oct. 15. The revised list of extras in cents per 100 pounds as compared with the previous list commonly quoted by the mills is as follows:

	New list	Former list
Three pass, cold rolled and annealed	$0.25	$0.15
Uniform color blue stove pipe stock	0.25	0.15
Uniform color blue elbow stock	0.25	0.15
Hot rolled, pickled and annealed	0.45	0.35
Single pickled, cold rolled and annealed	0.60	0.40
Special japanning stock	0.60	0.20 to 0.40
Automotive license plate stock	0.60	....
Full pickled, cold rolled and reannealed	0.80	0.60
*No. 1 metal furniture stock	1.15	0.85
*No. 2 metal furniture stock	0.95	....
Range steel, black	0.50	0.30
Range steel, black, stretcher leveled	0.85	0.55
Range steel, blue	0.75	0.50
Range steel, blue, stretcher leveled	1.10	0.75
Enameling stock (pickled and annealed finish)	0.50	0.40
Bow socket stock	0.75	0.50
Show card stock	0.75	0.65
Tea tray stock	0.75	0.65
Milk can stock	0.75	0.50
Full finished black plate	0.75	0.40
Pickled, annealed, cold rolled and reannealed for tinning	0.75	0.50
Nickel plating stock	1.50	0.90
Deep drawing or stamping quality	0.25	0.25
Extra deep drawing quality	0.50	0.50
Extra box annealed or reannealed	0.15	0.15
Oiling	0.10	0.10
Deoxidizing	0.25	0.15
Lime finish	0.10	0.10
Roller leveling	0.10	0.10
Patent or stretcher leveling (not including resquaring)	0.35	0.25

Resquaring 5 per cent of price of sheet at time of resquaring.

*Automobile sheet size extra to apply.

Strip Prices Are Firm

STRIP PRICES, PAGE 960

Pittsburgh, Oct. 10.—Higher prices on hot and cold-rolled strip steel, announced recently are being held firmly. Orders are coming from practically all consuming lines. Distribution of steel is hampered and operations are greatly interfered with by the railroad situation particularly in connection with those strip mills located on the Pennsylvania railroad, which for the past week or 10 days has accepted no shipment. Cold-rolled strip is quoted 4.50c and hot-rolled 2.90c base Pittsburgh, although on the latter prices up to 3.25c and even 3.50c are noted on the thin gages and narrow sizes.

Shape Awards Gain Sharply

New Gary Mill Alone Requires 20,000 Tons—Industrial and Power Units Take Round Tonnages—Prices Soften to 1.95c Pittsburgh

STRUCTURAL SHAPE PRICES, PAGE 960

New York, Oct. 10.—Structural buying underwent a sharp improvement within the past week, the larger awards aggregating close to 20,000 tons. Two of the outstanding contracts call for 5500 tons for the Juniata shops of the Pennsylvania railroad, and 3000 tons for the Brooklyn Edison Co. Another sizable job called for 2500 tons for a power plant at Springdale, Pa. New inquiry, however, continues light, few specifications of consequence coming before the trade. Shapes still run around 2.00c to 2.10c, Pittsburgh, on delivery in 10 to 12 weeks, this being at about what most current business is going. Approximately 2.20c, Pittsburgh, is done on an average on nearer delivery. Shipments are still being delayed due not only to embargoes, but to cars badly in need of repair. Fabricated steel prices appear a little easier than they did a fortnight ago.

Structural Demand Less

Chicago, Oct. 10.—Although much prospective building is being planned, bookings by fabricators were less during the past few weeks than formerly. The largest tonnage let in the West recently involves 2551 tons for a bridge at Los Angeles. Other lettings were for small tonnages. Fabricators have large tonnages on their books and mills are sold well ahead on plain material, but competition for new work continues keen. Plain material is quoted at 2.10c to 2.20c, Chicago mill, but prompt deliveries are impossible to obtain from either maker.

2.00c Applies on Specifications

Pittsburgh, Oct. 10.—The majority of structural specifications appear to involve shapes at a base price of 2.00c, Pittsburgh. The bulk of new business is being booked at 2.15c and up to 2.25c also is being quoted on small tonnages for prompt delivery. The 2.00c level was apparently the basis for figuring many of the larger jobs awarded recently, as judged by the figures named for material fabricated and erected. During the past week structural awards have involved merely nominal tonnages and are unnteresting from a market standpoint. Several weeks ago the structural tonnage required for the new tube mill of the National Tube Co. at Gary, Ind., was placed with the American Brake Co. involving approximately 20,000 tons. Few if any jobs involving large tonnages are pending at the present time in this territory.

Larger Jobs Pending

Cleveland, Oct. 10.—Few structural awards were reported in this district this week. One of 100 tons for a local interest and several smaller jobs were placed but of the larger projects pending, including 1700 to 2500 tons for a department store and 1500 tons for a high school, bids either have been closed or contracts approved. A softer tendency has developed in prices; while 2.00c to 2.10c Pittsburgh generally is the range, the Carnegie Steel Co. recently quoted 1.95c Pittsburgh, on a Big Four railroad inquiry for shapes.

Railroads Place Tonnages

Philadelphia, Oct. 10.—Demand for shapes in the past week has been from the railroads, chiefly, which have been placing tonnages for repair work in connection with heavy plate purchases. The structural demand is smaller than recently. Most of the shape business has been done at 2.00c Pittsburgh with some higher. Some special lots have gone at 1.95c Pittsburgh.

CONTRACTS PLACED

Awards reported this week	**44,060 tons**
Awards reported last week	**9,739 tons**
Awards reported two weeks ago	**3,339 tons**

20,000 tons, Gary tube mill, Gary, Ind., to American Bridge Co., Pittsburgh.
5500 tons, Juniata shops, Pennsylvania railroad, reported placed with McClintic-Marshall Co.
3000 tons, switchhouse and employe's building for Brooklyn Edison Co., Brooklyn, to McClintic-Marshall Co.
2551 tons for bascule bridge, Badger avenue, Los Angeles, Ross Construction Co., San Francisco, general contractor, to American Bridge Co.
2500 tons, power plant, for West Penn Power Co., Springdale, Pa., to McClintic-Marshall Co.
2200 tons, three apartments for Janison Construction Co., on Fifty-fifth, Eighty-sixth and Eighty-seventh streets, respectively, New York, to Hinkle Iron Co.
1500 tons, power unit, for Potomac Public Service Co., Williamsport, Pa., reported placed with an independent fabricator.
1200 tons, bridge work, New York Central, to McClintic-Marshall Co.
1100 tons, two apartments for Hagemann & Harris, Inc., Lexington and Sixty-ninth street, New York, to Hedden Iron Construction Co.
1000 tons, shop addition for American Locomotive Co., Schenectady, to McClintic-Marshall Co.
800 tons, National Bank building, Philadelphia, to an independent fabricator.
800 tons, school No. 64, New York, to Hay Foundry & Iron Works.
375 tons, building for Atlas Tack Co., St. Louis, Mo., to Stupp Bros.
300 tons, dormitory for Sailors' institute, University place and Ninth avenue, New York, to Hedden Iron Construction Co.
267 tons, bridge over Clearwater river for state of Idaho, Spalding, Idaho, to unidentified fabricator.
210 tons, apartment house, Geary and Taylor streets, San Francisco, to Central Iron Works.
200 tons, hotel, Modesto, Cal., to S. S. Herrick Steel Co.
200 tons, apartment, East Eighty-fourth street, New York, to Paterson Bridge Co.
150 tons, transmission towers for Great Western Power Co., to Pacific Coast Rolling Mills.
107 tons, building for Inland Glass Co., Clearing, Ill., to Atlas Construction Co.
100 tons, building for A. Claus Mfg. Co., Cleveland, to National Iron & Wire Co.

CONTRACTS PENDING

2500 tons, general contract for Continental Bank and Bank of Republic building, Salt Lake City, to P. J. Walker Co.
2000 tons, laboratory building for Ford Motor Co., Detroit, bids being taken.
533 tons, factory building for Broderick & Bascom Rope Co., St. Louis, bids being taken.
500 tons, apartment, Lexington avenue and Ninety-third street, New York, pending.
300 tons, mill for Pillsbury Milling Co., Buffalo, bids being taken.
300 to 400 tons, Y. M. C. A. building, Jersey City, N. J., pending.
250 tons, Oak Park Trust & Savings Bank, Oak Park, Chicago, Ill., bids in.
250 tons, shop and store buildings for American Steel Corp., Sandusky, O., bids closed.
200 tons, savings bank, Brooklyn, bids asked.
200 tons, East End hospital, East Eighty-first street, New York, bids asked.
195 tons, Dosewallips bridge, Portland, Oreg., bids closed Oct. 10.
100 tons, substation for New York Edison Co., East Fifty-first street, New York, pending.

New Atlas Steel Corp. Elects Officers

Consolidation of the Electric Alloy Steel Co., Youngstown, O., and the Atlas Crucible Steel Co., Dunkirk, N. Y., as the Atlas Steel Corp, has been followed by election of officers and directors. Louis J. Campbell, president of the Electric Alloy company, has been elected chairman of the new company and will be the directing head of the organization. Arthur H. Hunter, president of the Atlas Crucible company, was elected president. Other officers include: Vice president, J. H. Roberts; secretary and assistant treasurer, W. D. Myers; and treasurer and assistant secretary, H. G. Nichols.

Directors include James A. Campbell, president of the Youngstown Sheet & Tube Co.; H. G. Dalton, of Pickands, Mather & Co.; T J. Bray, president of the Republic Iron and Steel Co.; Johnathan Warner, president of the Trumbull Steel Co.; S. P. Ker, president of the Sharon Steel Hoop Co.; W. A. Thomas, former president of the Brier Hill Steel Co.; Charles S. Thomas, Louis J. Campbell, A. E. Adams, L. A. Manchester, S. Livingstone Mather, G. A. Colton, E. B. Green Arthur H. Hunter, R. L. O'Brien, J F Carter, H. F. Van Der Voort, H. G. Nichols, R. J. Gross and Maurice Joseph

Army Forgings Offered

Washington, Oct. 10.—Bids will be opened on Oct. 23 at Toledo, O., by the commanding officer of the Toledo ordnance reserve depot for the sale of approximately 22,693 gross tons of forgings, semifinished shells and finished shells, all stored at the Toledo depot. One lot comprises 13,600 tons of forgings and semifinished shells. A second includes 2055 tons of inert finished stokes trench mortar shell. A third totals 7038 tons of inert finished shell for cannon. On Oct. 19, at the Rock Island, Ill., arsenal, bids will be opened for the sale of surplus material at the arsenal, including shafting, switchboards, transformers and motors. On Oct. 17, at Chicago, the Chicago district ordnance salvage board will open bids for the sale of 122 hydraulic pumps weighing approximately 1754 gross tons. Forty-eight tank cars are offered for sale under bids to be opened by the chief of engineers, war department, at Washington, on Oct. 24.

Tabulates Steel Bids

New York, Oct. 10.—Opening of bids on plates, shapes and bars by the New York Central railroad last week brought out the following prices: Carnegie Steel Co., 2.045 Youngstown, on bars, plates and shapes; Illinois Steel Co., 2.00c, Chicago, on bars and 2.10c on plates and shapes; Alan Wood Iron & Steel Co. and Lukens Steel Co., 2.54c, Newberry Junction, Pa., on plates; Donner Steel Co., 2.15c, Buffalo, on bars; Inland Steel Co., 2.30c, Indiana Harbor, on plates;

Cleveland Steel Co., 2.34½c, Cleveland, on plates; Jones & Laughlin Steel Co., 2.00c, base Pittsburgh, on bars and shapes and 2.25c on plates; Republic Iron & Steel Co., 2.00c, base Pittsburgh, on bars; Central Iron & Steel Co., 2.54c, Newberry Junction, on plates; Bethlehem Steel Co., 2.26½c, West Seneca, N. Y., on bars and 2.16½c on plates and shapes. The Carnegie Steel Co.'s price of 2.045c, Youngstown, on bars, plates and shapes was equivalent to 1.95c, base Pittsburgh.

Wire Shipments

Delayed by Car Shortage—Some Consumers' Plants Closed

WIRE PRICES, PAGE 960

New York, Oct. 10.—Inability of some wire mills located in the Pittsburgh, Youngstown and Cleveland districts to make shipments because of the car shortage has led to the closing down of some wire consuming plants in this district. This curtailment on the part of consumers is not widespread but it promises to become much more marked if the present railroad congestion continues. Prices are unchanged at 2.45c base Pittsburgh, for plain wire, and 2.70c for nails.

Inquiry Is Strong

CHICAGO, Oct. 10.—Inquiry for wire and nails is strong, but mills are unable to take on the tonnage offered as production is not increasing rapidly, due to the railroad situation. This affects production by limiting fuel supply and also by reducing shipments of raw material from steel mills. Not much wire and nails is being accumulated in warehouse, as it has been possible up to this time to ship practically all that has been produced. The market is steady at 2.45c, Pittsburgh, for wire and 2.70c, Pittsburgh, for nails.

Operating Rate Is Fair

Pittsburgh, Oct. 10.—Mill operations among wire and nail manufacturers are around 70 per cent of capacity. Some interference has been felt because of the transportation situation. Just now the main drawbacks are the continued shortage of common labor and wire drawers as well as the car shortage. Some customers still are taking their material in open top cars although at considerable risk during bad weather. New demands and specifications are coming in at a high rate both on wire and nails and while on interest's prices still are at variance with the going market levels to the extent of being $1 per ton higher, wire is firm at 2.45c as are wire nails at 2.70c, base Pittsburgh. Producers are committed as far ahead as 60 or 90 days to consumers and 60 days to jobbers. Because the American Steel & Wire Co. is so heavily obligated, it is practically impossible for it to take more orders for delivery this year.

Breaks Production Record

Youngstown, O., Oct. 10.—The Brier Hill Steel Co., established a new record for its open hearth steel ingot production in September when its furnace department produced 68,197 gross tons of steel. The previous record was made in October, 1920 when the output totaled 67,640 tons. No more than 11 furnaces were in actual operation during September.

Car Purchases Sustained

Railroads Continue Renewed Buying Movement, Placing Orders for 5361 in Week—Rail Placements Subside—Track Needs Active

RAILROAD TRACK MATERIAL PRICES, PAGE 960

New York, Oct. 10.—Awards of the past week involve more than 5000 cars, principally for western railroads. At the same time, inquiry improved, with three eastern railroads in the market for 1000 cars each. Locomotive buying includes 30 for the Erie and 59 for the Atchison, Topeka & Santa Fe., both orders going to the Baldwin Locomotive Works. Car awards in September involved 10,357 cars, including 2000 for the Atlantic Coast Line and 3000 for the St. Louis & San Francisco. This is a marked improvement over the preceding month when only 1600 cars were placed.

Car Buying is Resumed

Chicago, Oct. 10.—Railroads continue to place orders with car builders for additional rolling stock and during the past week more than 4000 cars have been let in the Chicago market. In addition to this, inquiries for 5000 cars have come out. The cars bought during the week represent an additional steel tonnage of about 40,000 tons, practically all of which will be furnished by mills at Chicago.

Buying of standard steel rails has been completed, and as track fastenings were bought with the rails little activity in these departments is expected for several months, although it is believed many of the western roads will need additional tonnage later for 1923 delivery. Demand for light rails is the best in six months, as mine operation is resumed. Railroads are good buyers of finished steel for repair work in their own shops, and the total on mill books from this source is fairly large. With inquiries pending for several thousand additional freight cars, a busy winter for builders and for mills furnishing material is forecast.

Only One Rail Inquiry

St. Louis, Oct. 9.—The only new rail inquiry received here is from the San Antonio & Aransas Pass railroad, which is for 5500 tons. The Pennsylvania lines west of Pittsburgh are in the market for 100,000 tie plates and the Mobile & Ohio 200 wheels. The Illinois Steel Co. took an order for 2500 kegs of track bolts and 4500 kegs of spikes from the Missouri, Kansas & Texas.

Accessory Orders Large

Pittsburgh, Oct. 10.—Practically all roads either are inquiring or are ordering large lots of track bolts, spikes or tie plates. At least six large orders still are pending. Included in the recent buying are 600,000 tie plates for the Big Four; 2,500,000 tie plates and 15,000 kegs of spikes for the Norfolk & Western, and a sizable spike order for the Boston & Maine. Tie plates now are quoted at a minimum of 2.35c and up to 2.50c; standard spikes, 2.85c to 3.00c; small spikes, 3.50c to 3.75c; and track bolts at 3.85c to 4.50c, base Pittsburgh.

Additional light rail orders are coming to mills from coal mine operators who continue to furnish the bulk of this business. These buy in single carloads or a carload for each operation so that sometimes 4 to 10 cars are involved in a single order. The Carnegie Steel Co. and the Cambria Steel Co. both have a large amount of this business on their books which lately has been taken at 2.25c, base Pittsburgh. While deliveries have been somewhat hampered of late, mainly by the embargo of the Pennsylvania railroad, shipments of size probably will resume this week.

The New York, New Haven & Hartford railroad recently placed an order with the Westinghouse Electric & Mfg. Co., East Pittsburgh, for five 181-ton electric locomotives.

CAR ORDERS PLACED

Texas & Pacific, 150 cars, to American Car & Foundry Co.
Union Pacific, 52 cars, to Mt. Vernon Car & Mfg. Co.
Cincinnati, Indianapolis & Western, 200 gondolas, to American Car & Foundry Co.
Chicago, Rock Island & Pacific, repairs to 400 cars, to Western Steel Car & Foundry Co.
Pennsylvania, 70-ton trucks for 10,000 freight cars, awarded.
Western Pacific, 100 automobile, to General American Car Co.
Chicago & Northwestern, 800 composite gondolas and 200 steel flat, to General American Car Co.
New York, Chicago & St. Louis railroad, 300 steel underframes, to Standard Steel Car Co.
Santa Fe, 2650 various types, to American Car & Foundry Co.
New Orleans Great Northern, 200 additional cars, to Southern Car Co.
Interstate railroad, 1000 hoppers, to Pressed Steel Car Co.

CAR ORDERS PENDING

Indian State railways, 3130 miscellaneous cars; not repairs, as previously reported; bids asked.
Central of Georgia, 65 miscellaneous coaches, bids asked.
Delaware & Hudson, 1000 gondolas, bids asked.
Buffalo, Rochester & Pittsburgh, 1000 gondolas, bids asked.
Erie, 1000 gondolas, bids asked.
Lehigh & New England, 100 hopper cars, pending.
Chesapeake & Ohio, 50 cabooses, pending.
Santa Fe, 2500 box cars, bids asked.
Rock Island, 2500 cars of various types, bids asked.
Chicago & Northwestern railroad, 800 ore cars, 50 tons capacity, bids asked.

Surplus Iron Increases

Birmingham, Ala., Oct. 10.—The report as to surplus pig iron on yards in Alabama on Oct. 1, 1922, shows a total of 111,816 tons against 72,009 tons on Sept. 1, or an increase of 39,807 tons. The increase is due to insufficient railroad service. The tonnage on yards Oct. 1, is divided as follows: 90,303 tons of foundry; 9370 machine cast, 1500 tons in warrant, and 10,643 tons of basic.

Will Build at Youngstown

Youngstown, O., Oct. 10.—New mills of the Brier Hill Steel Co. will be erected at the Youngstown plant, it is announced by the company. The tube mills will be between the present plate mills and the new strip mill, which will be at the end of the present bar yard. The company has a large tract of land suitable for expansion of the new departments at any time in the future.

Building Bars Still Active

Sizable Tonnages Placed in Week—Spavinaw Water Project in Oklahoma Calls for Round Lot of Concrete Steel

REINFORCING BAR PRICES, PAGE 960

Chicago, Oct. 11.—While a large demand still exists for reinforcing bars in fair sized tonnages, buying is rather slow and not as much business is being booked as during the past few weeks, bookings of small lots continuing heavy make up the profitable part of the business. New projects are coming out steadily for bids, but they are not being pressed as much as formerly. Business now pending promises a heavy volume during the fall and winter and the recession in demand is much less than usual at this season. Among the larger projects is 5000 to 10,000 tons for the Spavinaw water job at Tulsa, Okla., for which the Walbridge-Aldinger Co., at Detroit has taken the general contract. The price continues at 2.50c, Chicago warehouse, although this is shaded occasionally on attractive business.

Demand Is Light

New York, Oct. 10.—New concrete reinforcing projects in this district continue of limited proportions, so that the current demand for concrete bars is quiet. Owing to the fact that the mills are comfortably booked, prices are well maintained and the market on concrete reinforcing bars for shipment at mill's convenience may be quoted 2.00 to 2.10c, base Pittsburgh. Work placed in the past week includes 700 tons for highways in New York and New Jersey and 650 tons for the Georgia-Carolina bridge. On concrete bars for shipment out of warehouse stocks, the minimum continues 2.50c base Pittsburgh.

General Contracts Are Let

Pittsburgh, Oct. 10.—Awards of concrete steel bars still are infrequent, although some fair sized tonnages undoubtedly will be placed this week. Among general contracts which recently have been awarded are one which involves 170 tons and another about 300 tons. The general contractors are expected to place these this week. No action as yet has been taken on the 750 to 1500 tons required for the Schenley apartments. One of the biggest jobs up now involves 250 tons or more for the Altoona, Pa., high school. Several other schools in the western Pennsylvania and West Virginia territories are up and involve smaller tonnages. Concrete bars still are quoted at 2.00c to 2.25c, base Pittsburgh. It is understood one interest has named 1.90c to some of its large regular customers.

CONTRACTS PLACED

Awards reported this week..... 5,871 tons
Awards reported last week..... 10,290 tons
Awards reported two weeks ago.... 6,353 tons

300 tons for filtration plant, Oklahoma City, Okla., to Corrugated Bar Co.
110 tons for Sterling Morton high school, Cicero, Ill., to American System of Reinforcing.
1200 tons, warehouse, Duluth, Minn., to Concrete Steel Co.
450 tons, apartment house, Minneapolis, to Concrete Steel Co.
650 tons, Georgia-Carolina bridge, to Corrugated Bar Co.
250 tons, building at Ft. Wayne, Ind., to Concrete Steel Co., general contractor, Fleisher Construction Co.
376 tons, building for Brier Hill Steel Co., Youngstown, O., to Truscon Steel Co.
350 tons, road construction, Somerville, N. J., to Concrete Steel Co.
330 tons, miscellaneous road work, New York and New Jersey, to Concrete Steel Co.
1400 tons, factory building, Butler Bros., Long Island City, N. Y., to Buffalo Corrugated Bar Co.
200 tons, building in Van Ness avenue, San Francisco, to E. L. Soule Co.
150 tons, Center street bridge, Stockton, Cal., to Gunn, Carle & Co.
105 tons, Hugh-Sparkman building, Fresno, Cal., to Kyle & Co.

CONTRACTS PENDING

150 tons for dormitory at Central Normal school, Mt. Pleasant, Mich., bids asked.
700 tons for waterworks construction, Memphis, Tenn., bids in.
134 tons for United States reclamation service, Denver, bids asked.
500 tons for concrete elevator at Ft. Worth, Tex., pending.
5000 to 10,000 tons for Spavinaw water project, Tulsa, Okla., general contract to the Walbridge-Aldinger Co., Detroit.
170 tons, warehouse for P. H. Butler Co., Pittsburgh; general contract to Hughes-Foulkrod Co.
300 tons, buildings for Chesebrough Mfg. Co., McKees Rocks, Pa.; general contract to A. Schenck.
250 tons, Altoona, Pa., high school; bids being taken.
1600 tons, mill at Buffalo for Pillsbury Milling Co., bids being taken.
350 tons, sewage disposal plant, Marion, O., general contract to A. Bentley & Sons Co., Toledo, O.

Line Pipe

Business is Plentiful—Other Grades Also Active, Except Cast

PIPE PRICES, PAGE 960 AND 1020

Pittsburgh, Oct. 10.—Considerable line pipe business is current both in the form of orders to large producers and inquiries embracing tonnages like that involved in the order placed by the Standard Oil Co. last week. This went to a valley pipe mill for shipment to South America and involved 25 miles of 8-inch line pipe, or approximately 1900 tons. Other tubular goods business, particularly standard full-weight merchant pipe, is still so heavy that producers cannot make satisfactory delivery promises. Operations keep up around 70 per cent of capacity.

In some quarters a new pipe card is anticipated although it is expected in others the new method of invoicing inaugurated Oct. 1 will bring in an increased measure of revenue which for a time at least will partly cover increased production costs. Pipe mills now apply the preferential and cash discounts to prices f.o.b. Pittsburgh instead of to the delivered prices; the base discount with extra discounts of 5 and 2½ per cent are reduced to a simple net discount from which the freight is deducted, which makes considerable difference on tonnages of tubular goods to be delivered at points far distant from Pittsburgh. For instance, the base discount of 68 off on black, 1 to 3-inch buttweld steel pipe, with 5 and 2½ per cent off reduces to a compound discount of 70.360 off.

As announced last week, charcoal iron boiler tube discounts were reduced 5 points on Oct. 2 by the Parkesburg Iron Co., Parkesburg, Pa., and other makers owing to advanced labor and raw material costs. This increased the price $10 per ton, the discount on less-than-carload lots on the 3¼ to 4½-inch size now being 16 off instead of 21 per cent off. The full list of discounts is given on page 1016

Private Demand Good

New York, Oct. 10.—Aside from a lot of 450 tons of 30-inch for Boston, bids on which will close tomorrow, municipal inquiry for cast iron pipe is quiet. A good, steady demand exists for small lots for private account, and the market continues strong, with makers booked up from 2 to 2½ months. Prices are unchanged.

Buys Boiler Tubes

Cleveland, Oct. 10.—Contract for 90,000 feet of 3½-inch boiler tubes for two passenger boats for the Detroit & Cleveland Navigation Co. has been placed by the American Shipbuilding Co. This amounts to between 150 and 175 tons and is believed to have gone to the Steel corporation subsidiary.

Buying Is at Minimum

Chicago, Oct. 10.—Because of delayed shipments and impossibility of obtaining delivery on cast iron pipe sooner than the end of the year, practically no business is being done in this market. Much repressed demand exists, but users realize the futility of placing further orders while tonnage bought several months ago is still undelivered. In some cases, pipe scheduled for April and May delivery is just coming through.

All Plants Still Busy

Birmingham, Ala., Oct. 9.—All cast iron pipe plants are working to capacity and endeavoring to catch up with delayed orders. Since the recent advance in quotations the lettings have been few. All plants are well supplied with raw material and no interference has been experienced except at Anniston and Chattanooga to which points the railroad service has just returned to a normal basis. With pig iron prices advancing the probabilities are pipe prices will go up again before the end of the year.

Philadelphia has placed 50,000 feet of 1¼-inch pre-calked joint cast iron pipe with the McWane Cast Iron Pipe Co., for a new filtration plant.

Oil Line Order Placed

Toronto, Oct. 9.—An order for 25 miles of 8-inch line pipe has been placed here by the International Petroleum Co., a Standard Oil subsidiary, for shipment to South America. The order has gone to the United States and will be filled by a valley mill which secured the business on its ability to give quick shipment.

Alloys Active

Except Ferromanganese and Spiegel on Which Users are Well Covered

FERROALLOY PRICES, PAGE 960

New York, Oct. 10.—Demand for manganese metals is slow owing principally to the large tonnages which were

placed prior to application of the new tariff. Sales of English ferromanganese during the past week have been small. This business was done at $67.50, c.i.f. tidewater, which plus duty, is equivalent to $101.10 for 80 per cent metal. A few hundred tons of English spiegeleisen have been sold at $39.25, duty paid, for 20 per cent metal. Some domestic 20 per cent spiegeleisen has been sold at $37 to $38, furnace.

Sales of 300 tons of 50 per cent ferrosilicon are reported at $70, f.o.b. maker's plant. Some 14 to 16 per cent electric furnace ferrosilicon is reported sold at $50, maker's plant. The quotation on 50 per cent ranges from $70 to $75, delivered. No Canadian 50 per cent now is being offered. Specifications on contracts are being made freely, but shipments are being retarded somewhat. Importers who have material in warehouse have advanced their quotations on the low carbon, 1 to 2 per cent carbon, to 28 to 28.50 cents per pound contained. They are quoting 12 cents on the 4 to 6 per cent carbon grade. Domestic material still can be had at 12 cents a pound contained for the 4 to 6 per cent carbon grade, but one maker has advanced his price to 14 cents for this grade and reports sales. Tungsten business has been slow. Ore prices receded slightly, to $7 to $7.50 a short ton unit, but manufactured tungsten is steady at 80 to 85 cents a pound contained for ferrotungsten and 85 cents to $1 for tungsten powder. Consumers have not shown much interest the past week. A number of inquiries and orders for ferrovanadium are reported, largely for delivery over the next three or four months. Tool steel makers are buying more freely. Quotations are unchanged at $3.50 to $4 a pound contained.

Market Is Limited

Pittsburgh, Oct. 10.—Both purchases and inquiries for ferroalloys are limited. Most buyers are well covered for the remainder of the year, and some under restricted operations have enough to last into 1923. This is particularly true of ferromanganese. Consumers are receiving shipments of material which cost them from $30 to $33.60 under the prevailing market levels. Small users are inquiring. Domestic producers refrain from naming quotations on larger quantities and the English price on 80 per cent material of $105.89, delivered Pittsburgh, still is the market's gage.

Spiegeleisen users, too, are well covered. Official prices still are $38 and $39, furnace, on 16 to 19 and 19 to 21 per cent material, but quantity purchasers undoubtedly could do less. A sale of a single carload of 16 to 19 per cent material went at $37 furnace.

One or two inquiries are out for ferrotungsten in addition to the unfilled portion of the Atlas Crucible Steel Co.'s requirements, estimated now to be 300,000 pounds. The market is quotable at a minimum of 85 cents. Ferrovanadium is unchanged at $3.50 where it is firm. Inquiries are absent. Ferrochrome is 13 cents, Pittsburgh warehouse, with few inquries current. The Pressed Steel Car Co. was a recent purchaser of low grade ferrosilicon and is reported to be in the market still for the 50 per cent grade. While the former has been bought for around $42, delivered, the latter now is quoted at a minimum of $67.50, freight allowed, and $70 and higher is quoted.

The Nonferrous Metals

Zinc Is One Metal To Yield to Lower Prices, but Freight Troubles Hinder All—Tin Higher

	Copper—Electro delivered	Copper—Lake delivered	Spot Straits New York	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Oct. 4.....	14.00	14.12½	32.75	6.62½	6.75	20.00	6.75	32.00
Oct. 5.....	14.00	14.12½	32.87½	6.60	6.70	20.00	6.75	32.00
Oct. 6.....	14.00	14.12½	33.00	6.60	6.65	20.00	6.87½	32.00
Oct. 9.....	14.00	14.12½	33.20	6.65	6.62½	20.00	6.87½	32.00
Oct. 10.....	14.00	14.12½	33.50	6.65	6.62½	20.00	6.87½	32.00

†Outside market quotation.

NEW YORK, Oct. 10.—Increasing reflection of the freight embargoes and car shortages is noted in the nonferrous metal markets. Consumers are having their troubles moving their product and buying raw materials conservatively. The copper market appears less hard hit than other markets to date, due to the fact that the New England freight situation is less acute than that of the Middle West and shipments of copper from the seaboard refineries to the New England rolling mills have not been hampered. It is more difficult to move freight from the seaboard to Buffalo and other inland points, but the New York state barge canal is being used to some extent. Prices have been firm excepting in zinc, which has suffered a rather sharp reaction.

Electrolytic copper has held through another week at 14c, delivered. Most producers are quoting only through January but sales of electrolytic through June have been reported made at the 14-cent price. Buying has been moderate, but sufficient in view of the small stocks to prevent any price cutting. Export sales have been of a respectable total. Casting copper has been selling at 13.40c to 13.50c, refinery. Lake copper has been firm at 14.12½c to 14.25c, delivered. No changes in brass or copper rolled products prices have been reported this week.

Zinc prices have receded about ¼c from the high level of the movement reached 10 days ago. Sales of prime western for October-November shipment have been made at 6.60c, East St. Louis. The shipping and operating troubles of the galvanizers have caused them to slow up as to zinc purchases, especially as they bought rather heavily on the advance. High grade zinc prices are unchanged 7.75c, delivered. The base price of sheet zinc was advanced Oct. 6 to 8.50c, f. o. b. mill, with the usual extras and discounts.

The American Smelting & Refining Co. advanced its pig lead price Oct. 6 to 6.50c, New York. Previously the outside price has ranged from 6.30c to 6.35c, East St. Louis and from 6.62½c to 6.75c, New York. These prices apply to prompt and November shipments. Business has been less active, but still of fair volume.

Tin prices have been higher, reflecting the recovery in sterling exchange to above $4.42 and the advanced tin prices in London, both of which have been due to better feeling in England as to the Near East crisis. A fair tin business has been done here, mostly directly between importers and consumers. Straits tin prices have ranged between 32.75c and 33.50c for all positions. Ninety-nine per cent tin for prompt delivery has been selling about ⅜c below Straits; for shipment from China, about ⅝c below Straits. Tin is now the highest it has been at any time this year.

Outside sellers of aluminum, including the importers, have advanced their prices with the domestic producer, the general quotation for foreign metal in warehouse now being 20c for 98 to 99 per cent and 21c for 99 per cent virgin. Inquiry has been brisk, covering shipments during the next three to six months.

Antimony buying has been light, but holders have been maintaining firmly a price of 6.75c to 7c, duty paid, New York, for carlots.

Mill Products

(Base prices, f.o.b. mill)

SHEETS	
Copper, hot rolled 24 oz., min	21.50
High brass	18.50
Zinc, ga. 9 to 18 (plates ½c less)	8.50
Lead, full sheets (cut, ¼c more)	9.75
Aluminum, base 18 ga. and up	37.40
SEAMLESS TUBES	
High brass	23.00
Copper	24.75
RODS	
High brass, round, ⅜ to 2½ inch	17.00
Naval brass rod	19.00 to 19.50
WIRE	
Copper	15.50 to 16.00
High brass	19.00

Old Metals

(Dealers' Buying Prices)

HEAVY RED BRASS	
Cleveland	9.00 to 9.50
New York	8.50
Chicago	8.50
HEAVY YELLOW BRASS	
New York	6.25 to 6.50
Chicago	6.50
Cleveland	6.00 to 6.50
ZINC	
New York	3.50 to 4.00
Cleveland	3.50 to 4.00
HEAVY COPPER AND WIRE	
Cleveland	11.00 to 11.50
New York	11.00 to 11.50
Chicago	11.00
RED BRASS TURNINGS	
New York	7.75 to 8.25
Cleveland	8.00 to 8.50
YELLOW BRASS TUBING	
Cleveland	6.00 to 6.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.25 to 6.75
New York	6.75 to 7.00
Chicago	6.00
ALUMINUM BORINGS	
Cleveland	7.00 to 8.00

Ingot Production

Recovers in September, Making Gain of 159,197 Gross Tons

Production of steel ingots in September aggregated 2,373,779 gross tons, according to statistics compiled by the American Iron and Steel institute from production figures reported by 30 companies which in 1921 made 87.5 per cent of the total for the country. This output was an increase of 159,197 tons over the August total of 2,214,582 tons but still was 113,325 tons below the July production of 2,487,104 tons.

Following are the institute's production figures for all of 1921 and the first nine months of 1922:

1921	Open hearth	Bessemer	All other	Total
Jan....	1,591,281	608,276	3,429	2,203,186
Feb....	1,295,863	450,818	2,796	1,749,477
March..	1,175,591	392,983	2,404	1,570,978
April...	1,000,053	211,755	2,150	1,213,958
May....	1,047,810	216,497	1,543	1,265,850
June....	808,286	193,644	1,476	1,003,406
July....	689,489	113,312	575	803,376
Aug....	915,334	221,116	1,621	1,138,071
Sept...	908,381	265,152	1,207	1,174,740
Total for 9 mo.	9,432,088	2,673,553	17,401	12,123,042
Oct....	1,269,945	345,837	1,028	1,616,810
Nov..	1,294,371	363,912	1,718	1,660,001
Dec....	1,129,174	296,380	1,539	1,427,093
Total for year.	13,125,578	3,679,682	21,686	16,826,946
1922				
Jan....	1,260,809	331,851	822	1,593,482
Feb..	1,395,835	348,571	616	1,745,022
March..	1,918,570	451,385	795	2,370,751
April...	1,997,465	445,939	1,109	2,444,513
May....	2,214,774	494,893	1,474	2,711,141
June....	2,143,708	487,851	2,918	2,634,477
July ..	2,020,572	464,047	2,485	2,487,104
Aug. ..	1,807,310	404,379	2,893	2,214,582
Sept...	1,911,147	460,127	2,505	2,373,779
Total for 9 mo.	16,670,190	3,889,044	15,617	20,574,851

Average daily production of the 30 companies during September was 94,951 tons, and a gain of 12,930 tons over the 82,021 tons of August. Upon this basis the average daily rate for the whole country was 108,515 tons, which compared with 93,738 tons for the month before was a gain of 14,777 tons.

Calculated upon the average daily production of September and 311 working days per year, the approximate annual rate of production for the 30 companies during the month was approximately 29,530,000 tons or 4,030,000 tons better than the indicated rate of August. The approximate annual rate of production for the whole country as indicated by the September output was 33,750,000 tons, which compared with the 29,150,000-ton rate of the month before was a gain of 4,600,000 tons. The annual indicated rate of production in September was about 76 per cent better than the total ingot production in 1921 and was about 77 per cent of the record output of 1917.

Awaits Cost Decisions

Washington, Oct. 10.—With both the District of Columbia appellate and supreme courts sitting again, the federal trade commission is hopeful of early rulings in the Claire Furnace and Maynard Coal cases, both of which involve compulsory cost reporting. The Claire Furnace case is before the appellate court, the supreme court having granted the iron and steel interests a permanent injunction restraining the commission, which the trade commission appealed last spring. The Maynard case still is in the shape of a temporary injunction, which the supreme court of the District will dissolve or make permanent shortly.

Dismisses Complaint of Three Company Merger

Washington, Oct. 10.—As field investigators for the federal trade commission have not yet completed their preliminary work upon the complaint against the Bethlehem-Lackawanna consolidation, it does not appear possible for the hearings to get under way before mid-November. The trade commission, meanwhile, has disposed of the Midvale-Republic-Inland merger complaint as follows:

"The federal trade commission announces the dismissal of its complaint against the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., in which it was alleged that the proposed merger of the companies was an unfair method of competition. The complaint was dismissed upon the filing with the commission of a formal statement by attorneys of record for the three companies that the merger had been abandoned."

Arrange Formal Transfer of Lackawanna Property

New York, Oct. 10—Final action on the Lackawanna Steel Co. purchase was taken by the Bethlehem Steel Corp. directors today. President Grace states "the transaction was completed this afternoon by delivery on the part of the Lackawanna company of all instruments for passing of title to properties and the delivery on the part of Bethlehem to Lackawanna arranging for the delivery to stockholers of their pro rata part of Bethlehem stock and cash upon the surrender of stock of Lackawanna held by such stockholders. The exchange is to be at the office of Kean, Taylor and Co., 5 Nassau street, and it is expected it will begin about Oct. 27. All corporate proceedings for the dissolution of Lackawanna have been taken and dissolution papers are being filed." President Grace took occasion to state there is absolutely no foundation for the rumor of a Bethlehem-Midvale merger and that no negotiations are underway or contemplated.

Output of Beehive Coke Continues To Gain

Washington, Oct. 10.—Production of beehive coke in the United States increased to 162,000 tons during the week ended Sept. 30, according to the United States geological survey. The daily average was 27,000 tons. In the week prior the total output was 137,000 tons, and the daily average 23,000 tons. Production in 1922 to Sept. 30 totaled 4,789,000 tons compared with 4,113,000 in the corresponding period of 1921. Production by districts is shown as follows:

	Week ended— Sept. 30, 1922	Sept. 23, 1922	Oct. 1, 1921
Pennsylvania and Ohio..	118,000	97,000	59,000
West Virginia	12,000	12,000	3,000
Alabama, Tennessee, and Georgia	11,000	10,000	6,000
Virginia and Kentucky..	10,000	9,000	5,000
Colorado and New Mexico	6,000	5,000	2,000
Washington and Utah...	5,000	4,000	4,000
United States total.....	162,000	137,000	79,000
Daily average	27,000	23,000	13,000

A slight decrease market production of soft coal during the first week of October. For three weeks in succession the output had been slowly increasing, reaching 9,776,000 net tons in the week of Sept. 30. During the week, Oct. 2-7, the returns indicated a total of about 9,600,000 tons.

Give Lower Rates on Coke

Washington, Oct. 10.—Sharp reductions in railroad freight rates on coke to the Virginia blast furnaces are granted in statutory tariffs filed by the Chesapeake & Ohio and Norfolk & Western railroads with the interstate commerce commission. The tariffs are effective Nov. 3.

The new Chesapeake & Ohio rates to stations on the Mountain division between Goshen and Clifton Forge are $1.70 per net ton from the New River district, $1.80 from Kanawha and $2 from Big Sandy. To Buena Vista, Lynchburg and other furnaces on the James river division the new rate is $1.80 from New River, $1.90 from Kanawha and $2.10 from Big Sandy. The new rates continue to Oct. 31, 1923; they are to be automatically cancelled on that date and substantially the old rates restored unless other action is taken. The new Norfolk & Western rates are $1.80 to Lynchburg, Roanoke and Buena Vista and $1.70 to the Pulaski-Radford group.

The Norfolk & Western also has filed a tariff extending until Dec. 31, 1922, the rate of $4.33 per net ton on coke from Norfolk & Western points in the Pocahontas district to Monessen, Pa. This rate of $4.33 expires Nov. 1, and the road's action extends it a month.

A tariff filed by the Chesapeake & Ohio, effective Oct. 26, makes the rate on coke from Earling, W. Va., to Roanoke, Va., $3.65 per net ton.

See Obstacles to Coal Inquiry

Government Authorities Doubt Possible Accomplishments of Commission, with Mine Workers Demanding Continuation of Schedule, and Operators Reluctant to Submit Panel—Legality Also Questioned

WASHINGTON, Oct. 10.—Demands of the United Mine Workers for continuation of the present bituminous coal mining wage scale until March 31, 1925, accompanied by the 30-hour week and overtime allowances, and difficulties of the mine workers and operators at their recent Cleveland convention in deciding whether to submit a panel of 20 names to the President from which to make selections for the federal coal fact finding commission have served to accentuate doubts here concerning the possible accomplishments of the commission.

The thought prompting the Borah act, which authorizes the commission, was not only to survey the coal industry and avert another prolonged strike but also to expose the economic ills of the industry and point to a cure that would make for lower fuel costs. The report on the bituminous branch of the industry is not due until March 1, or one month prior to the expiration of the present scale. If the mine workers succeed in wresting from the operators before March 1 a two-year continuation of the present scale the efforts of the commission will have been largely wasted.

It seems probable that the fact finding commission will be blocked from the legal point of view unless there is 100 per cent cooperation from the operators. Decisions in three federal trade commission cases all point the way for operators to refuse data to the commission, and more than one attorney can be found here who will give the unofficial opinion that the Borah act could be held unconstitutional. If the coal industry cooperates with the commission it will do what it has refused to accord the trade commission and the departments of commerce and interior.

The fact finding commission is setting out to ascertain costs of every description, the distributing organization of the industry, the ownership and number of mines, the extent to which the industry is overdeveloped from the standpoint of the labor required, the number of mines and the amount of invested capital, and all of the intertwining data. The starting point is production and selling costs. The commission's purpose is to probe the industry thoroughly in an effort to turn up apparent evils and propose a remedy.

Congress authorized the trade commission in 1919 to ascertain production costs of coal and iron and steel, to shed light upon the cost of living. The coal interests in the Maynard case and the independent iron and steel interests in the Claire Furnace case promptly challenged the right of the trade commission to demand monthly cost reports, and in both instances the trade commission was enjoined. The courts have held that the production of coal is an intrastate matter. They have said in effect that congress did not confer upon the trade commission the power to pry into intrastate matters, and that if it had the act would have been unconstitutional.

Operators May Refuse Data

The precedent has been set, therefore, for coal operators to refuse to divulge production cost data. Still another legal phase is presented in the Lorillard and American Tobacco cases, which the district court of southern New York last week decided against the trade commission. The trade commission had issued a complaint against the two companies and to work up evidence asked permission to scan and copy, if desired, all correspondence between the companies and their jobbers. When the companies refused the trade commission asked for a writ of mandamus. This the court denied.

The court held that to grant the writ, to permit the trade commission to go through the correspondence, "would be to permit of an unreasonable search and seizure in violation of the fourth amendment to the constitution." It ruled that the federal trade act did not empower the trade commission to proceed with "unlimited search and inspection of correspondence with the right to copy the same in the absence of specific complaint which would point out the materiality to that complaint of the particular correspondence and papers sought to be obtained."

The Maynard and Claire Furnace cases provide ample ground for operators to resist demands for production data. As to this there is no legal doubt, and the foundation upon which the coal commission must base its findings deals with production. As to the phases relating to distribution and interstate commerce in coal the tobacco decision here cited may possibly prove a stumbling block in case the operators choose to be obstructive. The coal commission's entire work appears to hinge upon the degree of co-operation proffered by the mine owners.

The federal fuel distributor continues to work out plans for speedier transportation of coal, and as the result of a conference with his transportation committee, of which Daniel Willard, president of the Baltimore & Ohio railroad is chairman, has made the following recommendations to all railroad executives:

1. Unload promptly all railroad material including railroad fuel.
2. Discontinue as far as possible all maintenance and construction work requiring use of power and cars so as to turn this equipment into commercial service.
3. Use all available forces to check yards and stations for delayed cars with a view to securing not only prompt unloading but also prompt movement.
4. Continue a vigorous campaign to reduce to the minimum locomotives and cars awaiting repairs.
5. Return foreign coal cars to owners or connections in home route with the greatest possible dispatch.
6. Loading of foreign coal cars in the direction of the mines, as permitted under I. C. C. Service Order No. 25, should be confined so far as possible to through movement to points on owner's rails.
7. Conduct an active campaign to have all cars loaded to their safe carrying capacity.
8. Point out to coal operators that available coal car equipment can be increased by the avoidance of sales that require abnormally long distance movement.

Warning that current production of coal only slightly exceeds consumption and there are no reserves to fall back upon, Fuel Distributor Spens has asked the co-operation of coal producers, the railroads and coal consumers in the following statement:

"The advisory committee on transportation, appointed by the federal fuel distributor, issued, on Oct. 5, a very urgent recommendation to the chief executives of all railroads, relative to the adoption of certain practices or plans which will make for a greater supply of coal car equipment. These recommendations contemplate that (a)

all coal cars loaded with company material and with railroad fuel, shall be promptly unloaded; (b) that all maintenance and construction work requiring use of power and cars shall be discontinued so far as possible, that this equipment may be transferred to commercial service; (c) that all available forces shall be applied to checking yards, terminals and stations for delayed loads and empties with a view to obtaining not only prompt unloading but prompt movement; (d) that a vigorous campaign shall be conducted to reduce locomotives and cars awaiting repairs to a minimum; (e) that foreign coal cars shall be returned to owners with greatest possible dispatch and (f) that loading of all foreign coal cars in the direction of mines as permitted under I. C. C. Service Order 25, shall be confined so far as possible to through movement to points on owner's road.

"The public should appreciate the fact that today there are unusually heavy offerings of traffic of all character to the railroads, and aside from the general priority orders of the interstate commerce commission that now obtain, we are hoping it may not become necessary to recommend any action that might interrupt the transportation of other commodities The priority orders now governing the handling of coal equipment are, of course, already interfering to some extent with the movement of commodities that are usually loaded in this class of equipment, but it is our great desire that there should be no greater interference with general transportation than appears to be absolutely necessary to care for the coal emergency.

"An analysis of the present coal transportation production and present reserves clearly indicates that for some weeks still to come the commodities covered by priority orders, particularly coal, must be given extraordinary attention.

"Coal producers and coal receivers can assist to a very large extent. Producers should load cars to carrying capacity, and should not load coal except to fill orders, on hand; in other words, they should not have unbilled cars on hand at mines, which practice is common under normal conditions, nor should coal be billed excepting to bona fide consignees. Existing conditions will not permit of making coal warehouses out of coal equipment. Receivers of coal should arrange to unload cars immediately upon arrival.

"During the miners' strike, the normal distribution of coal naturally became disrupted, involving greater hauls, and consequently greater time was consumed in the transportation of the loads and the return of the empties. Now that production of mines in all districts has been resumed, each mining district should, so far as it can practically do so, arrange to confine its operations to its normal sphere of consumption, thereby avoiding cross hauling of coals, and reducing the amount of transportation service to a normal minimum, which will make for a greater supply of cars. Consumers should, if the coal is available, confine their purchases to the grades of coal to which they have been accustomed.

"It has been suggested that to accomplish this program, it will be necessary to re-establish the zoning plan that obtained during former emergencies. We dislike, however, unless it should become absolutely necessary, to inaugurate restrictive regulations of this character, believing that the operators themselves will appreciate the mutual benefit to themselves, the carriers and the consuming public, by as complete a compliance with this recommendation as may be practicable."

Welding Society

Meeting at Chicago Emphasizes Saving in Repair Work

Chicago, Oct. 9.—Problems of welding, as applied to steel and cast iron, especially regarding rail joints and railroad repair work, were considered at the fall meeting of the American Welding society in Chicago last week. Two days were devoted to the society's own sessions and two to joint sessions with the American Electric Railway Engineering association on the municipal pier.

Important among the papers were the report of the committee on specifications for steel to be welded and a joint report of the gas, electric and thermit welding research committees on general properties of cast iron in respect to weldability. Welding of cast iron by gas, thermit and electric arc processes were discussed.

In the joint sessions with the railway association problems relating to various types of rail joint welds and car repairs were considered. Need for research and standardization was emphasized by C. A. McCune, president American Welding society, supplemented by a description of the work of the American Bureau of Welding and Organized Research by William Spraragen, National Research council. Problems of welded rail joints were discussed by E. M. T. Ryder of the third avenue railway systems, New York.

An interesting development of welding of cast iron is found in the suggestion that it need not be confined to repair work but perfection of methods will render it possible to use this method in joining parts of various structures of cast iron as now is done in steel. This provides a wider field of endeavor than is possible at present.

However, according to the discussions at the meeting, the greatest field for welding of cast iron at present is in repair work where expense and time loss may be saved in the repair of broken machine parts. Study of the resulting welds and efforts to make them homogenous and machinable is needed in the effort to bring this branch of the art to a point of greatest usefulness.

Particular attention was given to the application of welding of steel and cast iron in its application to the street railway problems, due to the joint meeting with the related association.

Tariff Items Modified by Australia

Washington, Oct. 10.—The tariff division of the department of commerce is advised by M. B. Synan, representative in New York of the Australian department of trade and customs, that the following reductions and alterations in the Australian tariff became effective Sept. 14:

	General Ad valorem Per cent	Preferential Ad valorem Per cent
Wire, fencing, gages 8 to 14, inclusive, for use only as fencing wire without further manufacture or for such manufacturing purposes as may be prescribed by department by-laws	10	Free
Wire netting	10	Free
Traction engines	10	Free
Alternating current recording watt-hour meters	45	35
	Per ton, Shillings	Per ton Shillings
Corrugated galvanized iron and steel plates and sheets	30	20

These changes are interpreted by Trade Commissioner Terrin, who recently returned from Australia, to be the effect of the closing down of the Broken Hill Proprietary Co.'s steelworks at Newcastle, N. S. W., since June and the lessened activity of the Lysaght wire plants at the same place. Wire and netting are prime necessities of Australia's great pastoral industry.

The Newcastle situation probably is responsible also for the further deferring to March 31, 1923, of the new protective duties on hoop iron and steel, iron and steel plates and sheets, iron and steel tubes, sewing machine heads, chain and cutlery. The duties on cables have been further deferred to Jan. 1, 1923. The duties had been deferred to Oct. 1, 1922, and the new dates appear to have been set in the belief that the labor troubles at Newcastle will soon be adjusted and that the plants will then be in position to compete with foreign goods.

Models, apparatus and documents connected with the various inventions of Thomas A. Edison, have been placed on exhibition in the Grand Central Palace, New York. The collection relates principally to electric developments including the incandescent lamp and the shunt-wound dynamo.

Coast Trading Is Better

Despite Freight Car Shortage and Transportation Difficulties Business Gains in Pacific Northwest—Reinforcing Bars Are Advanced $3 a Ton

SAN FRANCISCO, Oct. 7.—Trading in iron and steel continues to improve. Deliveries are held up due to car shortages in the East and as a result stocks are low. Building activities in the bay section fell off during the past month, the September permits numbering 661 and totaling $2,951,858 as compared with $6,214,082 for August. Los Angeles expects another 10,000,000 building permit month for September. Up to an including Sept. 26, 3656 permits were issued with an estimated valuation of $8,713,019.

Pig Iron and Coke

Little of interest has transpired in the pig iron market. What tonnages that have moved were almost entirely of small lots. With southern iron holding around $27.50 Birmingham dealers state that it is impossible to interest consumers in the domestic product as foreign pig is being offered at around $32 delivered.

A shortage of coke has appeared. Some shipments of English coke are expected within the next two weeks. One interest offered $22.50 for spot foundry coke but was unable to secure a supply. Coke for future shipment is holding around $15 to $16 a ton.

Bars, Plates and Shapes

Bar mill operators have announced a $3 per ton advance on reinforcing bars effective Oct. 2. The new price is now 2.95c f. o. b. San Francisco in 250 ton lots. No change in merchant material has been made. Bookings of large tonnages of concrete bars have been light.

Prices on bolts, nuts and rivets have advanced in this territory. One interest put into effect on Oct. 4, a $3 per ton advance on boiler and structural rivets and are now quoting 3.25c and 3.15c respectively. While trading is not normal, demand is coming from practically all sources and mill representatives report fourth quarter contracts satisfactory. Small rivets are holding at 65-5 off, large and small machine bolts cut thread at 50-10-10 off and small machine bolts rolled thread at 60-10 off.

Buying of hoops and bands continues limited and little improvement has occurred during the past two months. The minimum on hoops and bands here is now 2.90c base Pittsburgh and in some cases 3.25c is being obtained for the smaller sizes.

Demand for plates is holding up. The General Petroleum Co., has decided to do their own fabricating on four 80,000 barrel tanks and have placed 1300 tons of plates with one interest and 400 tons of shapes with another interest. The Western Pipe & Steel Co., secured 11 of 13 80,000 barrel tanks for the Associated Oil Co., involving 2600 tons of plates and shapes. The minimum price appears to be 2.45c c. i. f. San Francisco with some material going at 2.60c.

Although most structural awards during the past week called for small tonnages, several fair sized lots aggregating over 3000 tons were placed outstanding among which was 2500 tons for the Cerritos channel bridge in Los Angeles awarded to the American Bridge Co.

Other Finished Material

On the Southern Pacific Co.'s inquiry, for 40,000 kegs of 5/8 x 6-inch track spikes, 11,000 kegs of 9/16 x 5½-inch spikes, 7000 kegs of 7/8 x 4½-inch track bolts and 5500 kegs of 7/8 x 5½-inch bolts it is reported that the steel corporation secured most of the business, some of it going to the Colorado Fuel & Iron Co. This same company also closed on 3,000,000 tie plates and while it has not been verified it is believed the steel corporation secured this business.

The Oakland Traction Co., placed with Bethlehem 25 tons of 7-inch 122 pounds rails. The Steel corporation secured 2750 tons of 70 pounds rails, 6000 pairs of angle bars, 1000 kegs of 9/16 x 5-½ spikes, 160,000 tie plates for the Alaska engineering commission. It is understood a delivered price of $63.-35 Seward, Alaska, was made on the rails. The corporation also secured 530 tons of 60 pound rails for Honolulu interests.

Galvanized sheets continue to move well but no large tonnages have been reported. Nothing below 4.50c base Pittsburgh is heard of in this territory. The first large sale of tin plate reported this season consisted of 40,000 base boxes for an interest in the Northwest, the price being $4.75.

Oil country goods continue to move well. Stocks of standard pipe and especially building sizes are about depleted and jobbers are concentrating all their efforts to effect better deliveries. Oil field operations reported to the state oil and gas supervisor for the week ending Sept. 30, show 21 new wells started as compared with 27 the previous week. Total this year to date 1042; total same date last year 1052. Deepening or redrilling jobs numbered 13 as compared with 15 during the preceding week. Total this year, 607; total same date last year 554.

A $3 per ton increase on cast iron pipe is noted in this market, the new delivered price being around $55 per ton. Only one award was made during the past week. The United States Cast Iron Pipe & Foundry Co. secured 465 tons of 8 to 18-inch for Alhambra. Demand from private sources has eased off considerably.

Scrap Activity Subsides

(Concluded from Page 966)

reserve to prevent them coming into the market. Cast scrap is quiet and sales of old machinery from the government warehouse at Chicago has had a depressing effect on this grade. Railroad specialties used by steel foundries continue scarce, but these foundries are not rushed with business and manage to get along. Offerings by railroads continue few and most of them are comparatively light. The Santa Fe is offering 23,000 tons and the Wabash 1080 tons.

Buying Is Halted

Boston, Oct. 10.—The recent rapid advance in scrap prices has had, for the time being at least, the effect holding up sales. This is especially true in cast scrap where consumers are reluctant to accept the new advances in the face of softness in the pig iron market. Most dealers have added another $1 to the price of No. 1 cast, and it is difficult at the present time to obtain any tonnage at less than $23, delivered. Heavy melting steel is in continued fair demand from Pennsylvania consuming points with $16 to $16.50 shipping point being paid. Chemical borings are scare, and are held at $17.50 by dealers.

Prices Are Softening

Cleveland, Oct. 10.—The scrap market is softening in sympathy with pig iron although actual price reductions are few. Heavy melting steel is down 50 cents a ton to $19.50 to $19.75 while the valley price has been cut to $21.75 to $22. Cast iron borings and machine shop turnings also are slightly lower in the valley, being off 25 cents a ton, the former being quoted at $18 to $18.25 and the latter $16.25 to $16.50. Consumers are not inclined to place new business, believing prices will be lower. However, they are refusing nothing offered on contract.

Market in South Firm

Birmingham, Ala., Oct. 9.—Foundries and other pig iron melters in the South are still buying scrap for their daily operations. Quotations show no change for the week. Heavy melting steel is still held at $20 by the dealers but consumers are offering no more than $15. No. 1 cast and stove plate are enjoying better patronage. All yards are being kept supplied with stock and all demands are being met promptly, the railroads giving good service.

Railroad Offerings Revive

St. Louis, Oct. 9.—Interest in the scrap market centers in the railroad offerings before the trade here this week. These amount to considerable tonnage, and there is speculation as to what effect they will have on the market. Much depends upon whether the roads will be able to get the shipments through and there is some doubt as to this because of the congestion which still prevails on most lines. It has been more than three months since any railroad lists of consequence have been out. The local dealers are in a good position to absorb the offerings. The lists follow: Wabash, 1100 tons; Mobile & Ohio, 800 tons; Pennsylvania, 2300 tons; Missouri-Kansas-Texas, 350 tons; Kansas City Southern, 350 tons and Terminal Railway association, 4800 tons.

Prices Bring Tonnages

Philadelphia, Oct. 10.—Recent high prices have brought out much larger offerings of scrap. These have checked the rising tendency and some grades normally not involving much tonnage are quoted lower. Easier prices are checking the consuming demand. Dealers are less optimistic and expect somewhat easier prices.

Buying of Iron in Britain Gains

Shipments to United States in September from Middlesbrough Amount to 31,119 Tons, Largest in 10 Years—Pig Iron and Steel Production Increasing—Continental Prices Rising

The Iron Trade Review Staff Cable

European Headquarters,
THE IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

Sterling—$4.40

LONDON, Oct. 9.—Exports of pig iron from Middlesbrough to the United States in September amounted to 31,119 tons, the largest tonnage in one month in 10 years. In August the shipment of pig iron from Middlesbrough to the United States was about 10,000 tons. The output of the furnaces has been sold through to the middle of November. Germany purchased 8460 tons of pig iron from Middlesbrough in the same month.

Production of pig iron in Great Britain in September amounted to 440,000 tons compared with 411,700 tons in August; 399,100 tons in July, and 369,200 tons in June. Production, of steel ingots and castings amounted to 560,000 tons in September compared with 520,800 tons in August; 471,100 tons in July, and 400,200 tons in June.

Demand for steel in Great Britain has been stimulated slightly by a number of shipbuilding orders. Inquiries are increasing for structural steel for the railways. Belgian competition lately has been ineffective and continued prices in general are rising. German wire at £14 ($61.88) is underselling the English product at £15 ($66.30).

Wages of ironworkers in the Midland have been reduced 5 per cent, and in the northern district 7½ per cent. Eight additional blast furnaces have been lighted in Scotland since August.

America Continues Heavy Buyer of British Iron

European Staff Special

Prince's Chambers, Corporation St.,
Office of THE IRON TRADE REVIEW,

Sterling—$4.39

BIRMINGHAM, England, Sept. 29.—The autumn revival so eagerly awaited and confidently predicted is developing rather unsatisfactorily. The trade has been unfortunate in meeting with the counteracting influence of Near Eastern complications which are considered directly responsible for a check in buying from South Wales, and also are credited with causing extremely depressed conditions in the South Staffordshire iron trade.

Bright spots are noted here and there. India has figured in the market with encouraging demand for bridge work and railway material, the former totaling something like 9000 tons, and at least 3000 steel wagons will be called for. A great amount of publicity has been given to the Soudan irrigation scheme, but it seems unlikely that this will bring great business to the steel trade, although fairly large quantities of reinforcing steel is likely to be required. It is considered remarkable that so much inquiry for pig iron has found its way to Northampton and Derbyshire, and lots ranging from 1000 to 4000 tons appear to be quite common. The Derbyshire furnaces encounter high rail rates, which handicap them in competition, but good sales have been made. As a result the stocks of iron at Middlesbrough have disappeared, and nearly all the business done is for delivery in the next two or three months. Prices of Middlesbrough No. 3 foundry appear to be fairly stable at £4 12s 6d ($20.30), though the tendency is upward.

The Barrow-in-Furness district has sold nearly all its accumulated stocks of pig iron to America and Canada.

One effect of the increased business has been to strengthen coke prices, renewed contracts for October representing an advance of about 3 shillings ($0.65) per ton.

An improvement in the general steel trade is perceptible. A revival in building appears to have set in. Constructional engineers have a fair number of contracts on hand, but few involve more than 100 tons of steel. A moderate business in rails is being done at Barrow, and the demands for hoops of various sorts are maintained. The few orders for ships given out have benefited the Northeast Coast to some extent, and there is an impression that following the recent wage reductions costs of shipbuilding are approaching a business basis. A significant feature of the orders is that they involve a great deal of roll changing, consumers restricting their contracts to very small tonnages.

The Ebbw Vale Iron & Steel Co.'s stoppage has closed temporarily an important source of semifinished supply, and a lot of business with Birmingham has been canceled. Semifinished material has become easier, quotations ranging between £7 ($30.73) and £7 2s 6d ($31.27). Belgium is still seeking business, the latest offer being at £5 13s 6d ($24.91) f.o.b. Antwerp, equal to £6 16s ($29.85), Birmingham. This is not a competitive figure, and it is doubtful if any merchant would buy merely to effect a saving of a few shillings per ton. As a rule, however, the Belgians are willing to supply material according to British specifications as to quality on the basis of an additional payment of 5 shillings ($1.09) per ton. The price quoted for standard joists by a Charleroi firm is £6 10s ($28.53) Antwerp, or a delivered figure of £7 17s 6d ($34.57) against £8 15s ($38.41) in Birmingham for British steel. The Belgians are evidently fully alive to the building revival in this country, and are likely enough to recover their old footing as suppliers of building steel.

Belgium is still sending common iron here, known as No. 3, sales having been made as low as £8 7s 6d ($36.76), delivered. This has the reputation of being often unreliable for stamping or machining, but as the corresponding Staffordshire and Lancashire iron costs at least £9 15s ($42.80) a great deal of the Belgian material is being taken.

Iron Trade Review's Cable Stirs Trade

BIRMINGHAM, Eng., Sept. 27.—The cablegram received this week from THE IRON TRADE REVIEW *was the first official announcement made in this country in regard to the tariffs finally adopted under the Fordney act. For several days the offices of* THE IRON TRADE REVIEW *have been bombarded with inquiries from interested traders.*

The announcement of a duty of $33.60 *on ferromanganese was received in some quarters with astonishment, but it appears that even in this line transatlantic business has hardly yet been affected. The very moderate duty of 75 cents per ton on ordinary pig iron is naturally regarded lightly, and the export trade with America is quite as brisk as it has been for some time.*

Considerable business in pig iron has been negotiated this week. The sales from the Cleveland district are well beyond 50,000 *tons for this month, and they include one contract for* 10,000 *tons of No.* 4 *foundry iron. Additional sales arranged total some* 30,000 *tons.*

Current Iron and Steel Prices of Europe

British Market

Home Market Prices. Gross Tons at Works or Furnace.

Corrected to Date by Cable

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	28.18	6 7 6
Sheet bars	27.63	6 5 0
Wire rods	39.78	9 0 0
FINISHED STEEL		
Steel bars, England, ¾ to 3-inch	37.02	8 7 6
Steel bars, England, ¾ to 3-inch, for export	35.36	8 0 0
Plates, ship, bridge and tank, England	37.02	8 7 6
Plates, ship, bridge and tank, England, for export	35.36	8 0 0
Plates, ship, bridge and tank, Scotland	37.02	8 7 6
Plates, ship, bridge and tank, Scotland, for export	35.36	8 0 0
Beams, England	36.47	8 5 0
Beams, England, for export	35.36	8 0 0
Beams, Scotland	35.36	8 0 0
Beams, Scotland, for export	34.26	7 15 0
Sheets, black, 24 gage	45.31	10 5 0
Sheets, galvanized, 24 gage	71.83	16 5 0
Rails, 60 lbs. and over	35.36	8 0 0
Rails, 60 lbs. and over, for export	33.15	7 10 0
Tin plate, base box, 108 lbs.	4.14	0 18 9
Steel hoops	45.31	10 5 0
Steel hoops, for export	44.20	10 0 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	19.89	4 10 0
Hematite, West Coast, Mixed Numbers	19.67	4 9 0
Basic Middlesbrough	18.23	4 2 6
No. 3 Foundry, Middlesbrough	20.44	4 12 6
No. 3 Foundry, Derby, Leicester, Nottingham	18.23	4 2 6
No. 3 Foundry, Northamptonshire	17.68	4 0 0
No. 3 Foundry, Staffordshire	18.23	4 2 6
No. 3 Foundry, Scotch	22.65	5 2 6
Ferromanganese, 76 to 80 per cent	66.30	15 0 0
Ferromanganese, 76 to 80 per cent, for export	62.99	14 5 0
COKE		
Yorkshire furnace	4.64	1 1 0
Yorkshire foundry	6.08	1 7 6

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Marks per metric ton
PIG IRON		
Hematite, Oberhausen	12.20	30,506
Foundry, No. 3, Oberhausen	10.58	26,454
Bessemer Stahleisen, Siegen	11.94	29,838
Foundry, No. 1, Oberhausen	10.61	26,524
Luxemburg Foundry	9.90	24,756
COKE		
Ruhr furnace	1.81	6018
Ruhr foundry	2.50	6257
SEMIFINISHED STEEL		
Billets	15.18	37,940
Sheet bars	16.26	40,660
Wire rods	15.81	39,530
FINISHED STEEL		
Standard rails	19.00	47,500
Merchant bars	18.77	46,930
Structural shapes	18.55	46,380
Ship plates	21.10	52,750
Medium plates, 3 to 5 millimeters	23.89	59,730
Sheets, below 3 millimeters	26.23	65,570
Tin plate	40.80	102,000
Plain wire	20.16	50,400
Bands and strips	21.77	54,430

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	21.53	285
Basic Bessemer, Lorraine	16.62	220
Foundry, Longwy, No. 3, sand-cast	15.87	210
Foundry, Longwy, No. 3, chill-cast	16.62	220
Ferromanganese, 76 to 80 per cent	71.40	945
COKE		
French furnace	7.19	95
German furnace, f.o.b. frontier	7.19	95
French foundry	9.37	124
SEMIFINISHED STEEL		
Blooms	24.18	320
Billets	26.07	345
Sheet bars	27.20	360
FINISHED STEEL		
Standard rails	41.55	550
Merchant bars	33.62	445
Angles	35.89	475
Normal beams and profiles	35.89	475
Plates, ship and tank, 10 millimeters and thicker	44.58	590
Plates, bridge and tank, 5 to 10 millimeters	48.35	640
Sheets, black, 3 millimeters	54.40	720
Sheets, blue annealed, 2 millimeters	68.00	900
Shafting, cold-drawn, 40 to 60 millimeters	64.22	850
Bars, 2 per cent nickel steel	83.11	1100

All prices are f.o.b. furnace or works.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	15.18	215
Basic open-hearth, Belgian	15.53	220
Gray forge, Belgian	15.18	215
Foundry, No. 3, Belgian	16.24	230
Foundry, No. 3, Luxemburg	16.24	230
Foundry, No. 3, Lorraine	16.24	230
SEMIFINISHED STEEL		
Blooms	22.59	320
Billets	24.36	345
Sheet bars	25.42	360
Wire rods	35.65	505
FINISHED MATERIAL		
Standard rails	30.01	425
Merchant bars	30.71	435
Normal beams and profiles	29.30	415
Plates, 5 millimeters and thicker	33.89	480
Sheets, black, 3 millimeters	37.77	535
Sheets, galvanized, 1 millimeter	100.61	1425
Plain wire	43.07	610
Galvanized wire	55.42	785
Wire nails	35.65	505

All prices are f.o.b. furnace or works.

The steel sheet trade is a little better, and a fair demand keeps up for thinner gages, largely for motor car building.

The galvanized sheet trade, which was chiefly responsible for the addition of four mills to the number of those in operation during August, maintains fair activity in spite of the counteracting effect of the political troubles in Eastern Europe. A brisk business continues to be done with Canada. It is reported here that the Dominion Sheet Metal Corp., Ltd., is increasing its capacity by at least 50 per cent.

As far as prices are concerned the minimum appears to be £16 5s ($71.33) f.o.b. South Wales, but the Nidland figure is £16 10s ($72.43) and in special circumstances higher prices are paid. The various makers appear to be maintaining their price agreement under the pool system.

Until recently the tin plate trade maintained a production of 70 to 75 per cent capacity, but the shutting out of the Near East markets has checked business, and some works have found it necessary to close. A little new business is coming from Australia and New Zealand, otherwise conditions are rather depressing.

Welsh Tin Plate Prices in Lower Trend

European Special Service

CARDIFF, South Wales., Sept. 28.—The position of the South Wales tin plate trade is less satisfactory than it was recently. In the past month, however, there has been a substantial recovery in the volume of the export trade in iron and steel generally. The total shipment for the week ended Sept. 9 was 16,566 tons, compared with 2703 tons in the week before, and 6424 tons two weeks earlier. Tin plate exports were increased by 8712 tons.

Sterling—$4.42

The export figures during the week ended Sept. 16 showed a startling reduction compared with the previous week. Only 3233 tons of iron and

steel were shipped. Shipments of tin plate were reduced by 7969 tons, iron and steel by 3058 tons, galvanized sheets by 1776 tons, and black plates by 531 tons. Shipments of tin plate amounted to 298,000 tons in the first eight months of 1922.

Little new business is coming along. Prices of tin plate are barely steady at 19 shillings ($4.20) basis f.o.b. for forward shipments, and 19 shillings 3 pence ($4.25) basis f.o.b. for prompt delivery. Works complain that prices are below cost of production, although the general trend is downward.

India and Canada have been in the export market, while small parcels have gone to Australia and South America. France is inquiring; otherwise the continental demand is very poor.

Home consumers are buying odd sizes at 18 shillings 9 pence ($4.14) basis f.o.b. Wasters are in demand, especially large sized lightweights at 17 shillings ($3.76) basis f.o.b. for C. W. Terne plates are dull.

Current quotations are: Cokes, 20 x 14 inches, 19 shillings to 19 shillings 3 pence ($4.20 to $4.25); cokes, quarters, 19 shillings 9 pence to £1 ($4.36 to $4.42); cokes, 20 x 10 inches, £1 8s to £1 8s 6d ($6.19 to $6.30); cokes, 28 x 20 inches, £1 18s 6d ($8.50 to $8.61); ternes, 28 x 20 inches, £1 14s to £1 15s ($7.51 to $7.73).

The order for 200,000 boxes of tin plate referred to recently is said to have been placed with the St. David's Teilo Works, Loughor.

India and Australia have bought galvanized sheets, and the tone of the market is very hopeful. It is anticipated that not only India, but South Africa will be purchasing rather freely before long. Prices are firm at £16 5s ($71.82) per ton for 24-gage corrugated in bundles. The situation with respect to thin gage, also is a shade better.

Tin and sheet bars are unchanged at the official minimum of £7 7s 6d ($32.60) per ton, delivered in South Wales. English spelter is £31 15s ($140.33) f.o.b. Swansea. Nickel is unchanged at £145 ($640.90) per ton for home and export. The scrap market continues lifeless.

The supply of iron ores for Polish Upper Silesia was the subject of a conference in Warsaw recently. The Poles want to induce the Upper Silesian works that have become Polish property to adapt themselves to working up domestic ores. It is hoped Polish ore mining will be developed. The adaptation is hindered by the fact that the capital required is lacking. The works require 400,000 tons of ore per year, while the Polish mines are scarcely able to supply more than 200,000 tons. The supply of ore from southern Russia, due to the bad state of the Russian railways, is nearly out of the question.

The supply of coke also causes much anxiety to Polish industry. England and Czecho-Slovakia are able to supply large quantities, but their prices are very high owing to rates of exchange. German coke is much cheaper but it is difficult to obtain it. Scrap is obtained through the agency of a general purchasing organization, comprising the German Upper Silesian territory.

Production in the machine industry is impeded by shortage of money. It is hoped that it will soon be possible to export machinery to Russia.

Czech Works Idle as Crown Advances

European Special Service

VIENNA, Sept. 28.—The Czech crown is increasing steadily in volume, while at the same time the industrial situation in Czecho-Slovakia is becoming more oppressive. The Witkowitzer Werke, the largest steelworks in the country, has had to dismiss 9000 workers since March, 1922. Other works have had to take similar measures. Stocks are accumulating and very few orders are received. To remedy the situation, industrial managers propose the following: Reduction of the coal tax, railway freight rates and the bank rate; decrease of wages and lowering of taxes.

Czech Crown—$0.0334

The magnesite export of Slovakia which has been exclusively to the United States will be stopped Oct. 1, the shippers report, due to the increase in the American tariff rate.

Austrian industry continues fully engaged, although the country is passing through a serious economic crisis which may end only through financial control by the League of Nations.

Within the last few days important negotiations have been concluded in Russia. The negotiations were between the president of the Russian-Asiatic Corp., Leslie Urquhart, and the soviet representative, M. Krassin. Before the war, the corporation possessed large territories, forests, mines and navigation enterprises in Russia. It has now been given a lease on its former possessions. The group of English capitalists interested has secured the co-operation of German industrial leaders.

All political parties in Russia acknowledge the great importance of a distinctly defined helpful attitude of the United States. Reference is made to treaty concluded between a trade company of American workers, the American-Russian Trade Industrial Workers association, and the soviet government, ceding to the association the exploitation of enterprises in the richest coal and ore district of Siberia.

Canadian Buyers Relying on Imports

Foreign Special Service

TORONTO, Ont., Oct. 9.—Improved conditions with regard to fuel supplies is leading to greater production. While the number of furnaces in operation this week has not been increased, production of basic iron at the plant of the Steel Company of Canada, Hamilton, Ont., is between 300 and 500 tons per day. The Algoma Steel Corp., Sault Ste. Marie, Ont., has one furnace blowing, alternately on basic and foundry.

There is a steady demand for 100 to 200-ton lots of iron for prompt shipment. Prices are holding firm. Local furnaces have nothing to offer in the Montreal market, the latter being supplied chiefly by producers in Great Britain. No. 1 (2.25 to 2.75 silicon) and malleable are quoted at $39.30, and No. 2 (1.75 to 2.25 silicon), $38.30, Toronto.

While a slight improvement is reported in production in finished iron and steel, local mills are still behind in deliveries. It is becoming more apparent each day that the Toronto market must rely considerably on the United States producers for supplies. The shortage of coal and the difficulty in securing steel supplies during the coal strike and transportation difficulties, brought this fact forcibly to the attention of Canadian consumers, many of whom were forced to wait.

Canadian mills have considerable tonnage on their books and new business is coming in as fast as they can accept it. Bars are in strong demand, with mills quoting 2.60c to 2.80c, Toronto. Building activities continue to help along the demand for structural steel. Shapes and beams are selling at 2.40c to 2.50c, Toronto.

Buying of plates is active. Plates are quoted at 2.30c to 2.40c, Toronto. Demand for black and galvanized sheets exceeds the supply and until large shipments are made from the United States Canadian mills will be in a position to keep their mills operating at full capacity. Canadian mills are quoting No. 28 black sheets at 4.50c, and galvanized at 5.50c, Toronto.

More activity is reported in the demand for iron and steel scrap. Canadian consumers are again coming into the market for practically all grades. Dealers continue to offer from $10 to $11 per gross ton, Hamilton, for heavy melting steel, and $5 to $6 per gross ton for turnings. Dealers are offering $10 per gross ton for scrap rails and $16 per gross ton for axles, Toronto. Foundries are buying machinery cast in increasing tonnages for which dealers are offering $17 to $18 per net ton, Toronto. Stove plate and malleable scrap also are in better demand.

Mine Owners Discuss Problems

Members of American Mining Congress Take Up Problems of Taxation and Industrial Conflict at Twenty-fifth Annual Convention—Manufacturers Exhibit Mining Equipment Including Cars and Locomotives

TAXATION, industrial relations, standardization and problems of mine operation were among the subjects covered in the extensive program of the twenty-fifth annual convention and exposition of the American Mining congress which opened Monday at the new Public Hall, Cleveland. While a preliminary session on mine taxation was held Monday afternoon at the Hollenden hotel, the convention was not formally opened until Monday evening at the auditorium.

R. F. Grant, M. A. Hanna Co., Cleveland, chairman of the evening session, read a letter from President Harding in which he stressed the importance of the mining industry and cautioned that the national resources of the country should be developed only "with a full regard for the human interests involved." The address of welcome was delivered by Newton D. Baker, former secretary of war and president of the Cleveland chamber of commerce. Mr. Baker declared that an obligation rests upon the mining industry to develop means of co-operating with a view of avoiding industrial strife in the future.

The second general session, held Tuesday morning was devoted to various problems affecting mining operations.

Carmi A. Thompson, vice president, Tod-Stambaugh Co., Cleveland, who is the republican candidate for governor of Ohio, made a strong plea for fairness in the taxing of mining property, during a talk Tuesday morning on "Some Requirements of the Iron Ore Industry." He said legislators and the public have difficulty in understanding the iron mining business is a "liquidating business"; that is, the mines are being steadily exhausted. The new occupational tax in Minnesota is working out to about 10 to 12 cents a ton on iron ore as mined, and the trade outlook is not very hopeful, due to discrimination. He said in part:

"Iron ore has never enjoyed its full proportion of any prosperity that comes to the iron and steel industry from time to time. Just prior to and during the great war, and immediately following that period, when pig iron reached the unprecedented price of $50 a ton, iron ore sold at a price no higher than $5.50 a ton f.o.b. Lake Erie. On account of the advance transportation costs, the advances in material and in wages, only the most favored iron miner could 'break even' or make a meager profit. Many underground mines were forced to close.

"In addition to its disadvantage on account of its low market value the iron ore industry must bear a tremendous burden of taxation, and perhaps a greater burden, taking everything into consideration, than any other industry in the country.

"It is a well known fact among miners that as soon as a mining company commences to ship ore, it begins to liquidate its assets and the more successful the company, the greater will be the shipments of ore and consequently the company will be liquidated earlier. But, notwithstanding this, the national government has been inclined to figure profits without considering the loss of assets. However, the natural resource department, under the direction of the commissioner of internal revenue, is relieving the situation to some extent.

"Unless relief is found either in the way of increased prices or from some of the tax burdens the underground iron mines cannot be longer operated and thus our great reservoir of cheap ore from the open pit will be practically exhausted in the next 10 or 12 years and this country will be dependent upon underground ore for its steel which as we all know will insure a higher price of that commodity. Real public economy is to permit this business to exist in such a way that a fair proportion of the underground ore may be mixed with the open-pit ore."

Exhibits Show Scope of Industry

More than 150 manufacturers are exhibiting equipment used in mining operations in the exposition which is being held concurrently with the convention. Mine car and locomotive equipment seems to predominate, more than a score of firms displaying equipment of this type. Among those who are demonstrating mine cars and locomotives are the Fate-Root-Heath Co., Watt Mining Car Co., Fulton-Kenova Mine Car Co., Pressed Steel Car Co., Ironton Engine Co., Jeffrey Mfg. Co., Hockensmith Wheel & Mine Car Co., Mancha Storage Battery Locomotive Co., Atlas Car & Mfg. Co., Easton Car & Construction Co., Goodman Mfg. Co., George D. Whitcomb Co., and Lorain Steel Co. Rails, switches and other track material for mines are being exhibited by the Carnegie Steel Co., Bethlehem Steel Co., Hadfield-Penfield Steel Co. and the Lorain Steel Co.

Conveying and transmission equipment is being exhibited by a number of firms, including the C. O. Bartlett & Snow Co., Brown Hoisting Machinery Co., Link-Belt Co., Stearns Conveyor Co., and the Wellman-Seaver-Morgan Co. The last named company also is displaying hoisting engines, car dumpers and other heavy equipment. Pulverizers, rod mills, ball granulators, etc. are being shown by the Allis-Chalmers Mfg. Co., while crushers are being demonstrated by the Pennsylvania Crusher Co.

The importance of wire in the mining industry is reflected by the number of wire rope and cable manufacturers represented, among whom are the following: John A. Roebling's Sons Co., Simplex Wire & Cable Co., Williamsport Wire Rope Co., American Steel & Wire Co., and Upson-Walton Co. Wire screens are being demonstrated by the Ludlow-Saylor Wire Co. and the W. S. Tyler Co.

The tendency toward the use of ball and roller bearings for mine cars and for other uses in mining is indicated by the representative displays of bearings. Among the manufacturers showing this type of equipment are the Timken Roller Bearing Co., Gurney Ball Bearing Co., Bock Roller Bearing Co., S. K. F. Industries Inc., Hyatt Roller Bearing Co. and the Norma Co. of America.

Interest was attracted to the model of a mine shown by the Hudson Coal Co. and to the exhibit of the United States bureau of mines, which included various types of mine rescue apparatus and first aid equipment. Safety equipment was exhibited by the Safety Equipment Service Co., Mine Safety Appliance Co. and a number of other firms. Pipe fittings, valves, etc. were shown by the Reading Steel Castings Co. and the Lunkenheimer Co. Welding apparatus was demonstrated by the Oxweld Acetylene Co. and examples of welded material were shown by the Standard Welding Co. and by the Buckeye Welding & Supply Co., which exhibited the products of several manufacturers. Motors, electrical control equipment and other electrically-operated mine equipment were shown by the Westinghouse Electric & Mfg. Co. and the General Electric Co. A large electric mine locomotive was exhibited jointly by the Baldwin Locomotive Works and the Westinghouse company.

Among the other products at the exposition were pumps, blowers, conveyor belts, mine doors, filters, lubricants, circuit breakers, explosives, petroleum products, etc.

American Aid to Europe Is Urged

Bankers in National Convention Discuss Inter-Allied Debts and the German Reparations Problem—United States "Isolation" Is Impossible—Only England Can Repay Loan, McKenna Says

BY JOHN W. HILL, FINANCIAL EDITOR

AMERICA'S responsibilities in European rehabilitation, German reparations and the inter-allied debts bulked large in the discussions and deliberations at the annual convention of the American Bankers Association in New York last week. As a result, the bankers passed a resolution urging the government to "formulate the principles on which it will be able to co-operate with other nations to bring about the needed rehabilitation of European countries and peace in the world". Behind and leading up to this stand were these considerations brought out in discussions:

1, Because of America's vast world interests she cannot maintain an "isolated" position.

2, Because Europe is the best customer of this country's surplus products, prolonged and serious distress abroad eventually would affect conditions here.

3, The inter-allied debt and reparations' problems are closely related and their settlement in the near future is essential to the world's economic stability.

The most illuminating address before the convention was delivered by Hon. R. McKenna, head of the London Joint City & Midland bank, London. In his view no nation can pay a large external debt unless its people have an equally large accumulation of foreign investments. These investments can be taken over by the government and converted into foreign credits with which to meet the obligation. An attempt to pay the stupendous war debts by the ordinary means of an excess of exports from the debtor countries would mean that the creditor countries would be overwhelmed with goods.

From this point the British banker argued that England, with her large foreign security holdings, was the only nation which could pay her debt to America. Moreover Germany could only pay to the extent of her foreign holdings, which he estimated at $1,000,000,000. Beyond that she could pay only to the extent of an ordinary exportable surplus, of which she now has none. He urged a moratorium for Germany. This would stabilize the mark and permit an international loan to her.

As a result of this address and that of Thomas W. Lamont of J. P. Morgan & Co., who urged leniency by America in the matter of the allied debt, most of the bankers seemed to favor greater latitude for the American debt funding commission. Congress bound the commission to fund the $10,150,000,000 of allied loans at 4¼ per cent with payment to obe completed within 25 years. The commission soon will issue a formal report. In the meantime negotiations for funding the British debt will begin n Washngton. In November the alled ministers will again seek a definite settlement of the reparations problems. Mr. Lamont predicted success for this meeting.

Index to Business Trend Charts

THIS ISSUE

Subject	Page
Monthly Pig Iron Index	981
Railroad Freight Traffic	982
Security Prices	982
State of Credit	982
Foreign Exchange	983
Building Construction	983
Car Orders	983
Iron and Steel Price Parity	984
Copper Prices	984
Foundry Pig Iron Market	984
REFERENCES	
Cotton Consumption	Oct. 5
Independent Sheet Situation	Oct. 5
Iron and Steel Price Index	Oct. 5
Monthly Alien Migration	Oct. 5
Prices and Failures	Oct. 5
Railroad Earnings	Oct. 5
Structural Awards	Oct. 5
Bank Clearings	Sept. 28
Comparison of Employment	Sept. 28
Farmer Purchasing Power	Sept. 28
Foreign Trade	Sept. 28
Steel Orders	Sept. 28
Automobile Production	Sept. 21
Business Index	Sept. 21
Coal Production	Sept. 21
U. S. Cron Production	Sept. 21
Iron and Steel Foreign Trade	Sept. 14
Wholesale and Retail Prices	Sept. 7
Copper Prices	Sept. 7
Building Cost Index	Aug. 31
Wage Factor	Aug. 31
International Steel Market	Aug. 31
Commodity Prices	Aug. 24
Iron and Steel Production Rate	Aug. 24
Steel Earnings	Aug. 3
Long Time Trend of Wages	Aug. 3
Steel Output Per Capita	June 8
Dollar Purchasing Power	May 4
112 Years of Prices	March 10

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One month ago	One year ago	1913
Business failures	383	380	329	353	356
Cash Ratio Fed. Res. System..	77.4	78.4	78.3	69.0	.....
Loan rate, 4-6 months, N. Y. (per cent)....	4¼-4½	4¼-4½	4-4¼	5½-5¾	5½-6
(per cent)....	4¼-4½	4¼-4½	4-4¼	5½-5¾	5½-6
Aver. 20 Ind'l. shares	$96.62	$93.45	$97.42	$68.16	$79.07
Aver. 20 Rail shares	$91.79	$89.76	$93.10	$83.54	$105.50
Aver. 40 bonds	$81.91	$81.26	$82.34	$71.62	$93.00
Car loadings (week ended Sept. 23).....	973,291	945,919	890,000	874,641	*1,008,109
Bank debits 165 cities (000 omitted)	$9,696,785	$8,220,370	$7,406,356	$8,592,492	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	Oct. 9 (close)	Week before	Month ago	Year ago
Sterling	$4.86	$4.42	$4.39½	$4.45	$3.80¼
Francs	19.3c	7.55c	7.57½c	7.74c	7.29½c
Lira	19.3c	4.26½c	4.27c	4.39c	4.01c
Marks	23.8c	0.03 1/8c	0.05¾c	0.07¾c	0.81¾c

MONTHLY COMPARISON

	September	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$271,493,000	$322,007,000	$246,186,000	$71,450,000
Business failures:				
Number	†1714	1753	1562	1336
Liabilities	†$40,279,718	$40,101,313	$42,904,409	$22,723,000
Excess of exports	†$31,000,000	$54,000,000	$172,119,000	$54,406,000
Excess of gold imports	†$18,136,355	$42,341,613	$172,119,000	*$630,716
Bureau of Labor Price Index....	†155	155	142	100
Bradstreet's Price Index	136	130.8	121	100
Economist's British Price Index....	4189	4257	4924	2717
Cost of Living Index	†154.5	155.6	162.0	100
New incorporations	$664,000,000	$646,605,000	$498,846,000	$172,301,000
Railroad net earnings	†$53,000,000	$69,239,000	$90,240,000	$59,900,000

†August. *Monthly average export excess.

The Business Trend

October 12, 1922

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Indications continue strong for steady growth in business activities, and somewhat higher commodity prices; easy money and ample credit reserves and improved purchasing power of consumers will help sustain expansion; car shortage immediate adverse influence.

INDUSTRIAL ACTIVITY — September daily average pig iron output gained 11 per cent; number of furnaces in blast up 31 per cent Sept. 30; freight blockade may restrict further gains.

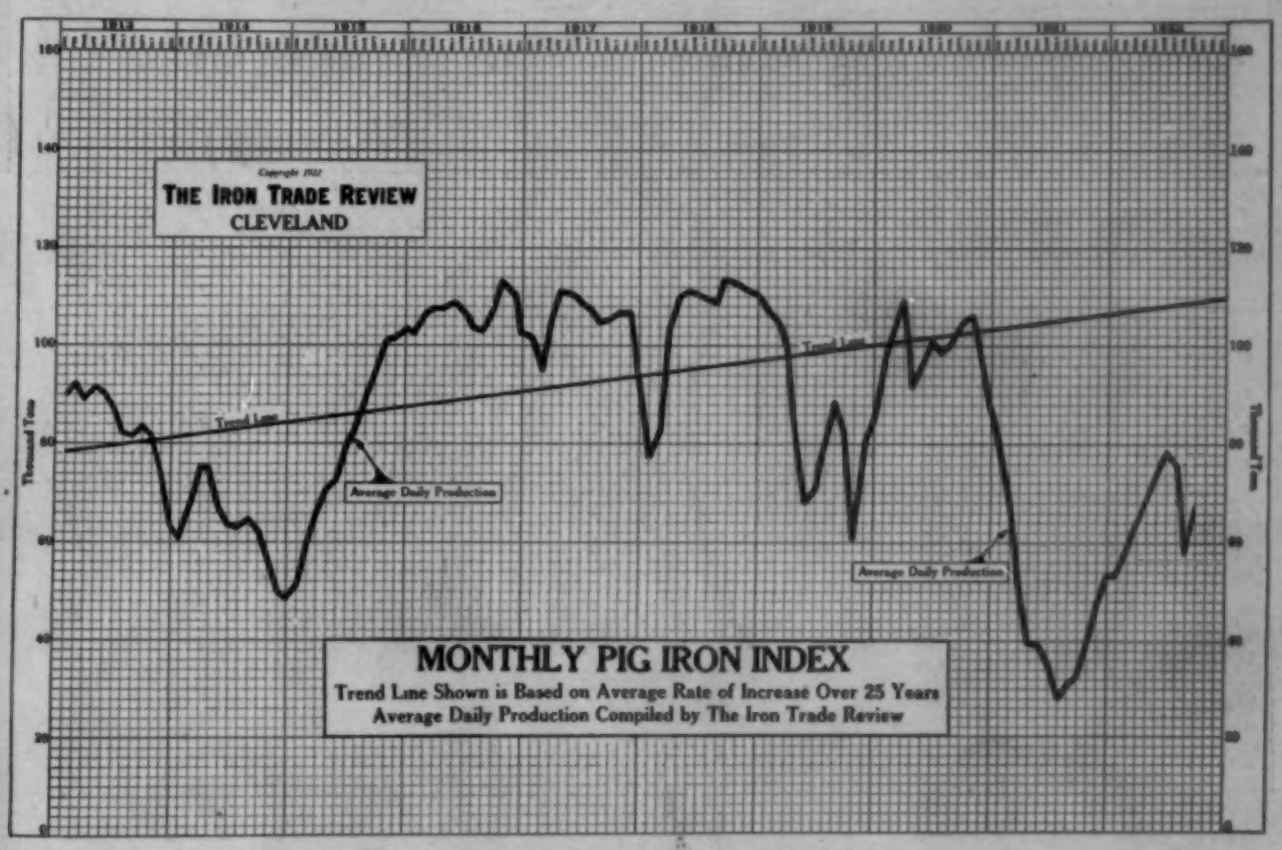
FREIGHT TRAFFIC—Car loadings virtually at peak of 1920 records, with bad order cars abnormal; net car shortage now over 100,000, and congestion looms.

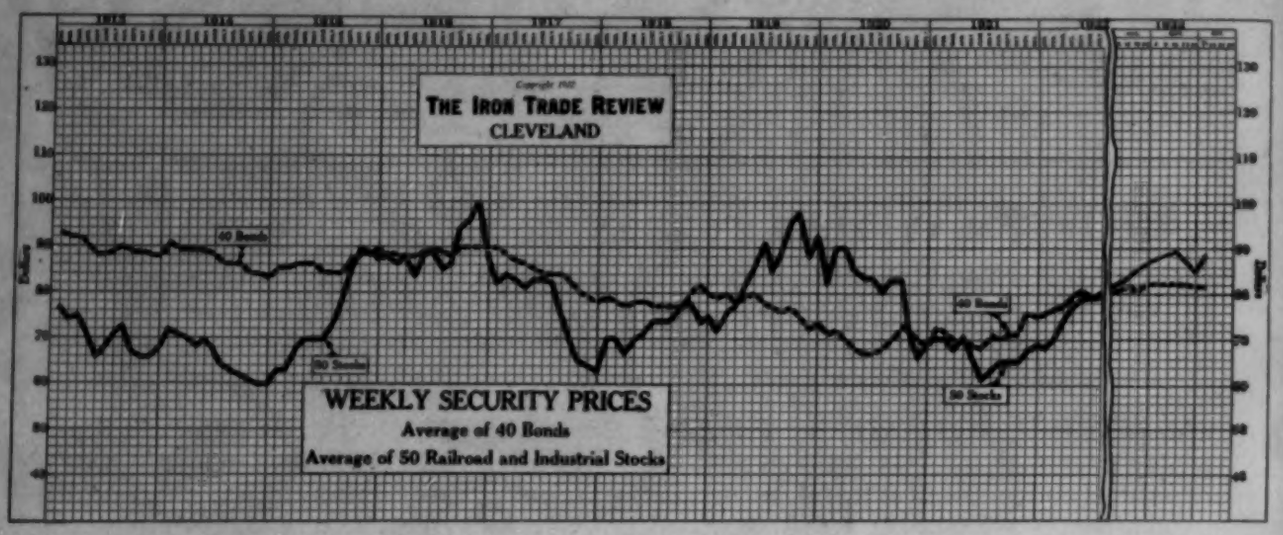
SECURITY MARKETS—Fifty representative stocks resume rise after recent slump due to speculative reaction and war scare; share movement favorable as business forecast.

CAR ORDERS—Freight car awards in September of 10,350 make large gain over August and September last year; total for nine months now 126,000, against 22,000 in 1921 and 80,000 in 1920.

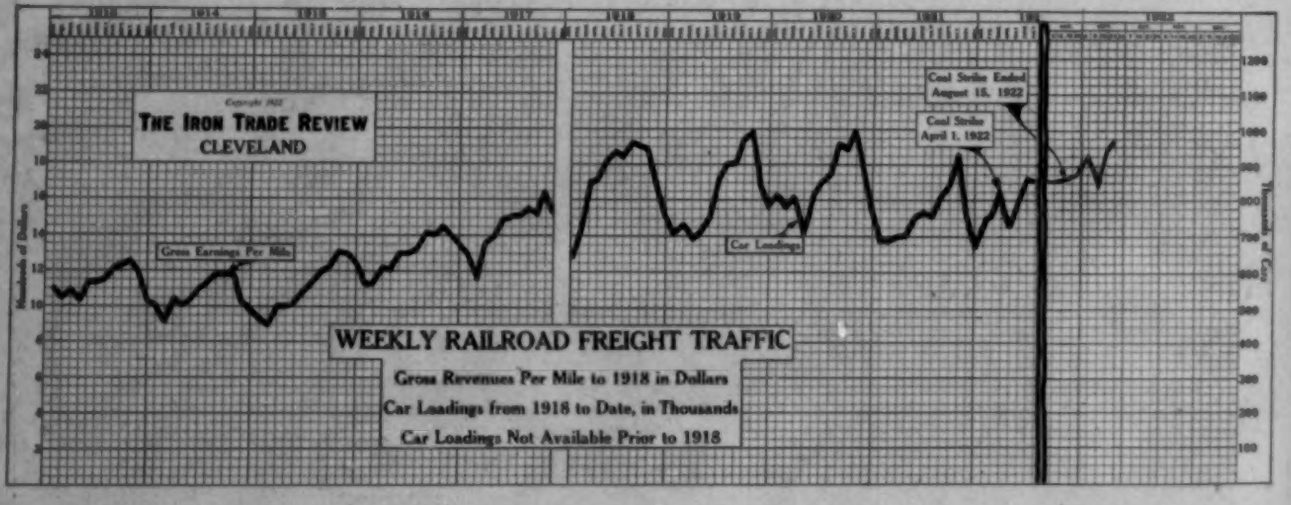
BUILDING CONSTRUCTION—September square feet total of building awards shows seasonal drop; volume largest for any September since 1919; value highest on record for the month.

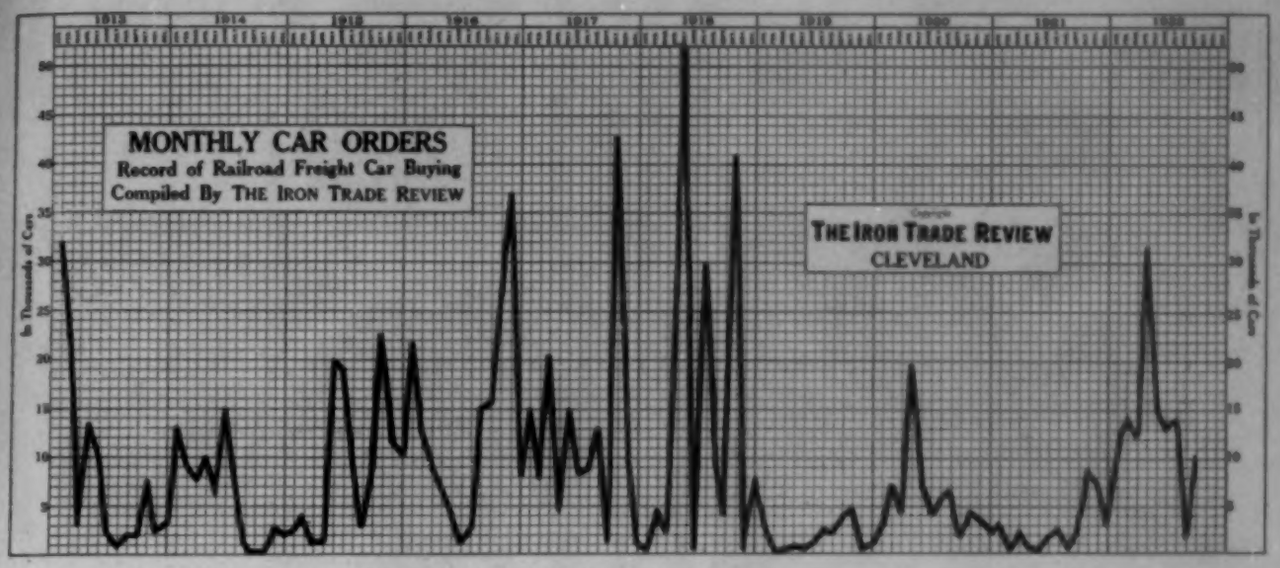
FOREIGN EXCHANGE—Sterling, francs and lira exchange rates advance over recent lows; marks hit new low record, as mark inflation speeds toward estimated need of 8,000,000,000 daily supply.

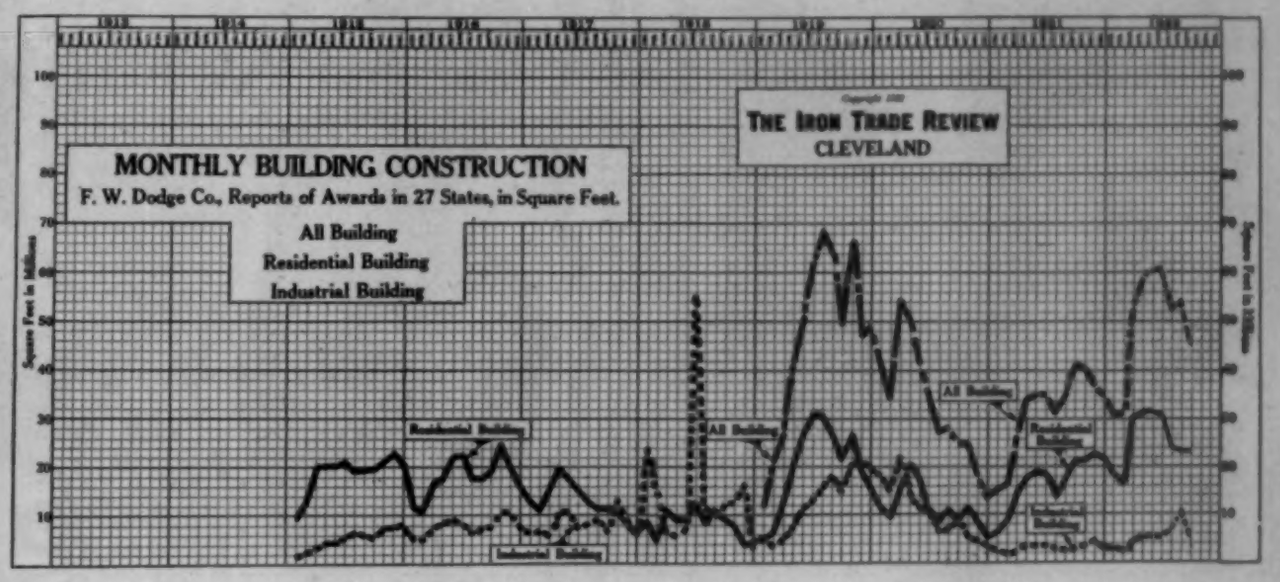

Copyright 1922
THE IRON TRADE REVIEW
CLEVELAND
Trend Lines
Average Daily Production
Trend Lines
Average Daily Production
MONTHLY PIG IRON INDEX
Trend Line Shown is Based on Average Rate of Increase Over 25 Years
Average Daily Production Compiled by The Iron Trade Review

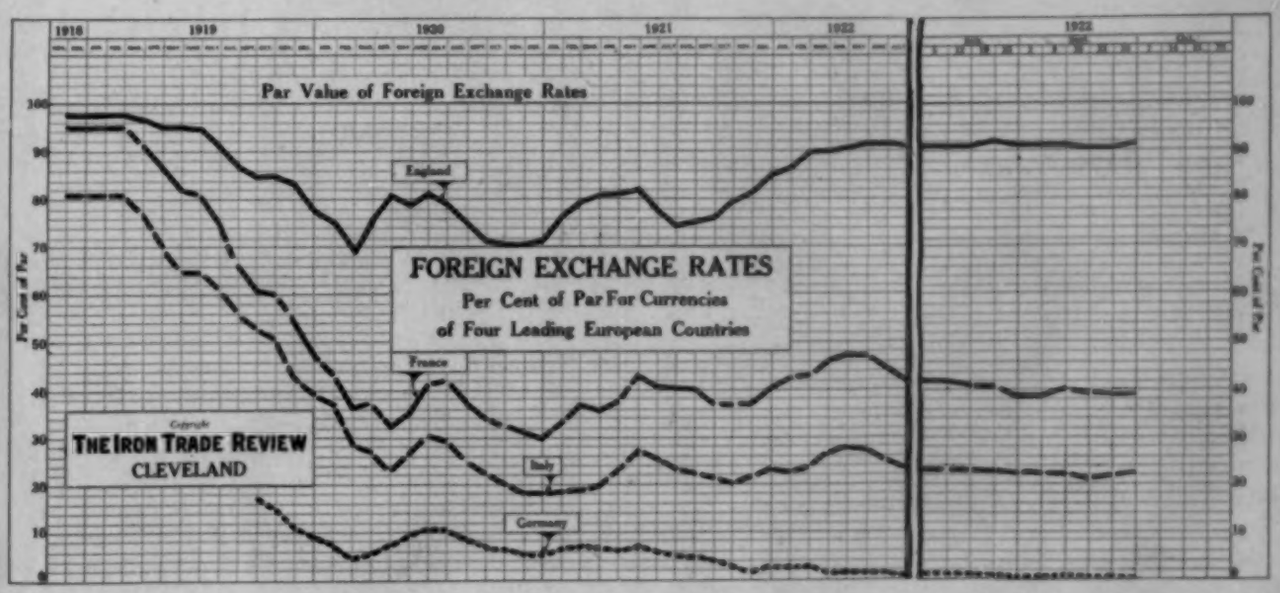

THE IRON TRADE REVIEW
CLEVELAND
40 Bonds
50 Stocks
WEEKLY SECURITY PRICES
Average of 40 Bonds
Average of 50 Railroad and Industrial Stocks

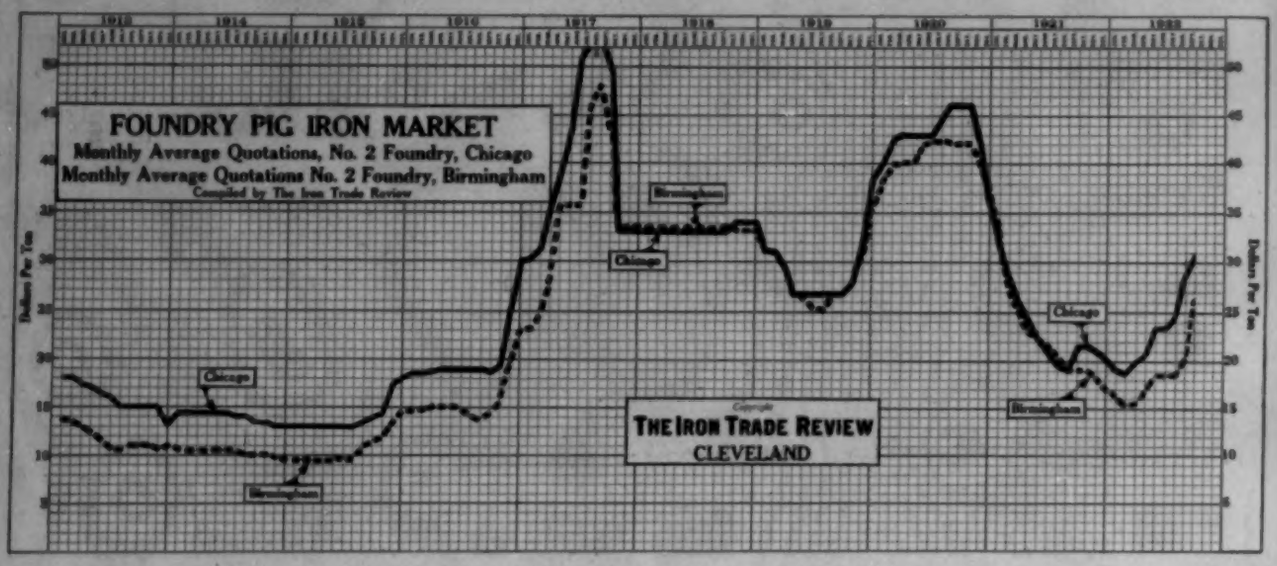
THE IRON TRADE REVIEW
CLEVELAND
WEEKLY STATE OF CREDIT
Cash Ratio, Federal Reserve System
Open Market Interest Rate
60-90 Day Commercial Paper, New York
Rediscount Rate, New York Federal Reserve Bank
Cash Ratio Federal Reserve System
Open Market Interest Rate
Federal Reserve Rediscount Rate
Per Cent

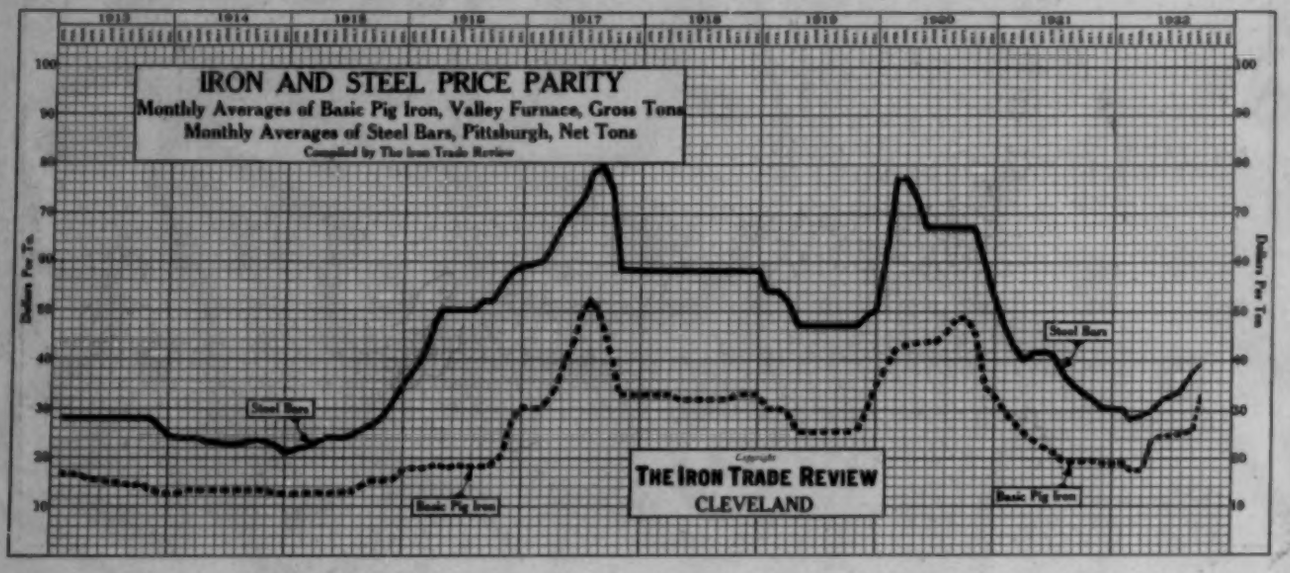

THE IRON TRADE REVIEW
CLEVELAND
Gross Earnings Per Mile
Car Loadings
Coal Strike Ended August 15, 1922
Coal Strike April 1, 1922
WEEKLY RAILROAD FREIGHT TRAFFIC
Gross Revenues Per Mile to 1918 in Dollars
Car Loadings from 1918 to Date, in Thousands
Car Loadings Not Available Prior to 1918

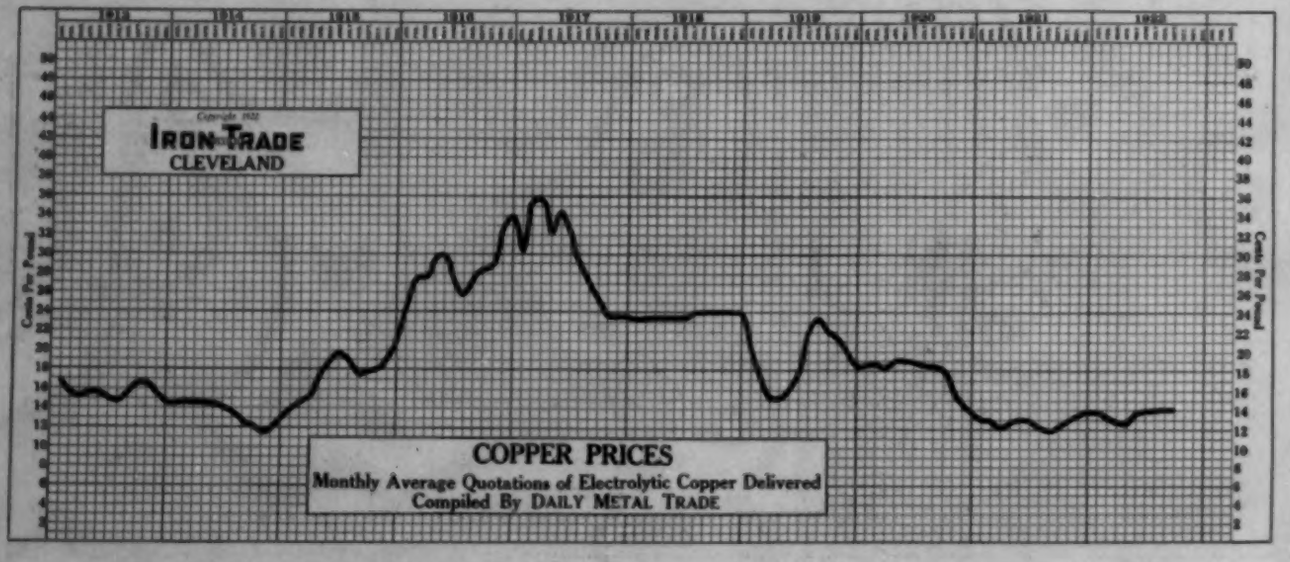

MONTHLY CAR ORDERS
Record of Railroad Freight Car Buying
Compiled By THE IRON TRADE REVIEW
THE IRON TRADE REVIEW
CLEVELAND


MONTHLY BUILDING CONSTRUCTION
F. W. Dodge Co., Reports of Awards in 27 States, in Square Feet.
All Building
Residential Building
Industrial Building
THE IRON TRADE REVIEW
CLEVELAND


Par Value of Foreign Exchange Rates
England
France
Italy
Germany
FOREIGN EXCHANGE RATES
Per Cent of Par For Currencies
of Four Leading European Countries
THE IRON TRADE REVIEW
CLEVELAND


FOUNDRY PIG IRON MARKET
Monthly Average Quotations, No. 2 Foundry, Chicago
Monthly Average Quotations No. 2 Foundry, Birmingham
Compiled by The Iron Trade Review
Chicago
Birmingham
Chicago
Birmingham
Chicago
Birmingham
THE IRON TRADE REVIEW
CLEVELAND


IRON AND STEEL PRICE PARITY
Monthly Averages of Basic Pig Iron, Valley Furnace, Gross Tons
Monthly Averages of Steel Bars, Pittsburgh, Net Tons
Compiled by The Iron Trade Review
Steel Bars
Basic Pig Iron
Steel Bars
Basic Pig Iron
THE IRON TRADE REVIEW
CLEVELAND


IRON TRADE
CLEVELAND
COPPER PRICES
Monthly Average Quotations of Electrolytic Copper Delivered
Compiled By DAILY METAL TRADE

France Must Work with Germany

A Survey of the Redistribution of European Iron and Steel Resources Brought About by the Versailles Treaty Shows Interdependence of French and German Interests—Czechs a New Power

BY H. COLE ESTEP

European Manager, Iron Trade Review

BY EFFECTING a redistribution of the physical resources of the European iron and steel industry, the treaty of Versailles has brought forces into play which will influence the industrial balance of power on the Continent for many years to come. Next to agriculture, the manufacture of iron and steel is perhaps the most important of mankind's industrial activities, for on an abundance of cheap steel depends strength in war, commercial power in peace, the maintenance and extension of transport by land, sea and air, and the creation of the purchasing power necessary for the importation of essential commodities. Therefore the new iron and steel alignment in Europe may readily have far reaching consequences.

In surveying the situation it is easy enough to indicate definitely the transfers of physical property, such as mines, blast-furnaces and steelworks, which have taken place since the treaty was signed, but after this is done it is not so easy to indicate definitely just what the new European balance of power in iron and steel is going to be. This is because the resettlement of the industry within its new national frontiers is as yet incomplete, coupled with the fact that leadership in iron and steel manufacture, as in other human affairs, does not depend entirely on physical assets. Questions of national psychology, training, experience and temperament also must be considered. Any appraisement of the European iron and steel situation at the present time must necessarily therefore be founded partially on opinion.

The Twin Bases

The twin bases of the iron and steel industry in any country are coal and iron ore. Both the coal and iron ore reserves of prewar Germany have been substantially reduced, to the advantage mainly of France, but also of Poland. In addition under the treaty of Versailles, a large portion of Germany's iron and steel making plants also has been surrendered to these two countries. Germany nevertheless remains the premier iron and steel producer of continental Europe, but with greatly reduced resources, and potentially France has it within her power, through control of the whole of the Briey ore fields, to outstrip her eastern neighbor. Whether she actually will or not only the future can tell.

First taking up the coal situation briefly, the total known and probable reserves of prewar Germany were estimated at 194,600,000,000 of tons. As a result of the loss of Lorraine, the occupation of the Saar, and the transfer of part of Upper Silesia to Poland, these reserves have been reduced to 78,000,000,000 tons, or about 40 per cent of the prewar amount. The current output has not suffered so severely although production has been greatly curtailed. The average monthly production of coal in Germany before the war was 15,800,000 tons; during the first quarter of 1922 it was 12,300,000 tons, or at 78 per cent of the prewar rate. From this must be subtracted the reparations coal and coke going to France and Belgium, amounting to about 1,700,000 tons a month. Germany's current fuel supplies are, therefore, 68 per cent of the tonnage available in 1913.

But fortunately for the German iron and steel industry the great Ruhr coal field remains undisturbed and from it comes most of the coal suitable for making blast furnace coke. The monthly output of Westphalian coke is now about 1,900,000 tons to which can be added 275,000 tons still obtained from Upper Silesia, making a total of 2,175,000 tons. Out of this 600,000 tons are going to France on reparations account, leaving for German furnaces 1,575,000 tons of coke monthly, sufficient with the lean ores used, to make about 800,000 tons of pig iron a month.

France First In Ore

But Germany is not making this much pig iron because of the ore situation. The treaty of Versailles not only seriously altered the distribution of European fuel supplies but had a much more drastic effect on the iron ore resources of the continent. The Briey basin contains the second largest deposit of iron ore in the world. Before the war it was about one-third in France and two-thirds in Germany. Today it is entirely within the French frontier. Without going further into the details of the prewar situation it is sufficient to state that at present France has within her borders over one-third, 35.2 per cent to be exact, of the entire iron ore resources of Europe. The French iron ore reserves at present, according to reliable geological estimates, are 4,369,000,000 of tons. Germany which was first before the war is now fourth in Europe with iron ore reserves of 1,374,000,000, Germany's share being 11.1 per cent of the total. Great Britain remains second with 18.2 per cent represented by 2,254,000,000. Sweden is third with 1,548,000,000, equivalent to 12.5 per cent and Russia is fifth with 8.3 per cent, and Spain sixth with 5 per cent.

The iron ore resources of Upper Silesia are not important but all of the

Effect Is Permanent

EVER since it was signed there has been more or less talk of revising the treaty of Versailles. This discussion centers mainly around the economic clauses of the pact, while those which deal with the new frontiers in Europe are not likely to be disturbed. Therefore whether some of its provisions are revised in the future or not, the treaty has had the effect of permanently altering the complexion of the European iron and steel industry. The old relationship as to raw material supplies, ownership of works and sales spheres have all been profoundly changed. The result has been the creation of a new balance of power in European iron and steel, which cannot help but affect the American iron and steel business in its competitive relations with the Old World. It was for the purpose of discussing this subject, at the same time outlining the effect of the treaty of Versailles on the redistribution of European iron and steel resources as a whole, that the accompanying article was prepared for one of the special reconstruction supplements of the Manchester Guardian Commercial, in which it was first published. As Mr. Estep's article shows, the treaty has had a much more far reaching and lasting influence on the European iron and steel industry than is generally appreciated in the United States.

Coal
Iron Ore
Iron And Steel Works
Pre-War Border
Present Border
RUSSIA
BLACK SEA
CONSTANTINOPLE
LATVIA
LITHUANIA
WARSAW
POLAND
ROUMANIA
BUCHAREST
BULGARIA
SOFIA
GREECE
ATHENS
BUDAPEST
HUNGARY
BELGRADE
YUGOSLAVIA
ALBANIA
TIRANA
BALTIC SEA
CZECHOSLOVAKIA
VIENNA
AUSTRIA
ADRIATIC SEA
SEA
TRIESTE
BERLIN
GERMANY
DENMARK
ITALY
ROME
SICILY
ESSEN
DUSSELDORF
COLOGNE
BERNE
SWITZERLAND
NETHERLANDS
LUXEMBOURG
METZ
ROTTERDAM
BELGIUM
LILLE
CORSICA
SARDINIA
MEDITERRANEAN
NORTH SEA
ENGLAND
LONDON
ENGLISH CHANNEL
HAVRE
PARIS
FRANCE
IRELAND
ATLANTIC OCEAN
MADRID
SPAIN
PORTUGAL
LISBON

10 mines in service in 1913 are now in Polish territory. The production of iron ore in this region in 1920 was only 62,644 tons.

Viewing the redistribution of European iron ore under the treaty of Versailles from the standpoint of annual production, we find that before the war Germany produced 28,600,000 tons within her borders to which Upper Silesia contributed 140,000 tons, or 0.4 per cent, and the Minette district of Lorraine 21,000,000 tons, or 71.7 per cent. Germany's consumption of iron ore in 1913 amounted to approximately 46,395,400 tons. She has available at present within borders laid down by the treaty, 7,500,000 tons of annual output. At present Germany may be estimated to require about 26,000,000 tons of iron ore annually if her blast furnaces are to be worked at capacity. Apparently, therefore, imports of around 19,000,000 tons a year are necessary.

French Ore Output Increased

France, on the other hand, has had her iron ore output increased from 18,601,000 tons to a potential 40,000,000 tons per year, sufficient for 10,000,000 tons of pig iron. But at present the organization of the French iron and steel industry is totally inadequate to cope with any such volume of production or trade. Nevertheless, it is by virtue of its influence on the distribution of iron ore resources that the treaty of Versailles will most powerfully affect the European iron and steel situation since in the years to come France has the opportunity to become the world's leading iron and steel producer outside of the United States. France's position in European iron and steel economy so far as physical assets are concerned is further strengthened by large accessions of iron and steel making plants as a result of the treaty of July, 1919. Briefly, it may be said that Germany lost through the treaty 40 per cent of the number of her blast furnaces, 30 per cent of her steel works, and 28 per cent of her rolling mills in the surrendered territories west of the Rhine.

On the French side of the border before the war, in Lorraine, there were some 60 blast furnace stacks and on the German side 68, making a total of approximately 128 stacks all of which are in France today. In 1913 there were also 25 basic bessemer converters on the French side of the line and about 11 open-hearth furnaces; in former German Lorraine there were 27 converters and 10 open-hearth furnaces which have since been surrendered to France, making a total of 52 converters and 21 open-hearth furnaces in Lorraine today. Germany then surrendered to France in 1918 a total of 68 blast furnaces, 27 basic-bessemer converters and 10 open-hearth furnaces. There were eight principal works. Most important was the Thyssen plant at what the Germans called Hagendingen, now Hagondange, a few miles north of Metz. The majority of the plants in this district lie in the Moselle valley in the 25-mile strip between Metz and Thionville. In addition to the Thyssen plant there are steelworks at Rombas, Hayange and Knutange, and blast-furnace plants at Uckange, Thionville, Ottange, Andunle-Tiche and Redange.

The result of the transfer of many of these works to French ownership has been a large increase in French iron and steel making capacity. In 1913 French Lorraine produced 3,493,000 metric tons of pig iron and 2,299,000 tons of steel ingots. In the same year German Lorraine produced 3,870,000 tons of pig iron and 2,286,000 tons of steel. The Lorraine of today all within French borders, therefore has a theoretical capacity of 7,363,000 tons of pig iron and 4,585,000 tons of ingots per year. Although these figures are useful only as indication of the potential position of Lorraine iron and steel in relation to the rest of Europe, they are exceedingly interesting and show a capacity in pig iron of three-quarters that of Great Britain and half of that of Germany within her own borders. The quantities also are in excess of those possible in any of the new states of Central Europe. They show that Lorraine may become one of the greatest iron and steel producing districts in the world.

But aside from business conditions which are restricting sales at the present time, it is not yet possible for the plants in Lorraine to produce anything like their theoretical output. During the war practically all the works in French Lorraine were destroyed, the damaged plants representing a productive capacity of two million tons of steel a year. About half of this capacity has been restored. Although the plants in the German part of Lorraine were not damaged like those on the French side of the border they inevitably suffered a measure of depression during the period of the transfer of control from German to French hands, so that today their capacity is estimated at 3,000,000 tons of pig iron and 2,000,000 tons of steel. This gives Lorraine's total capacity under present conditions of reconstruction as 5,000,000 tons of pig iron and 3,500,000 tons of steel per annum.

Important transfers of iron and steel property also have taken place in Silesia as a result of the treaty of Versailles. Out of 8 blast-furnace plants in this district comprising 37 stacks, five have become Polish and three remain German.

Of the 14 steel plants and rolling mills nine have gone to Poland and five are still on the German side of the border. The finishing mills in Upper Silesia include the following: Eleven forging establishments, seven of which have been assigned to Germany and four to Poland; seven tube mills, only one of which remains in Germany; 13 engineering works, of which six are in Germany and seven have been transferred to Poland; nine machine shops, of which five remain in Germany and four are in Poland; and finally, 14 miscellaneous establishments of various kinds such as wire mills, tin plate mills, etc., seven of which are still German and the other seven now Polish.

In 1913 Upper Silesia produced 994,601 metric tons of pig iron. In 1920 this had shrunk to 575,802 tons. Based on the capacity as shown by the 1913 figure, Poland has gained an annual pig iron output of 620,000 tons and an annual steel rolling capacity of 600,000 tons.

Before discussing the effect of these changes on Germany's iron and steel position some few details regarding the influence of the treaty on the Central European situation may be interpolated. Austria has been reduced from fourth in the list of Continental iron and steel producers to an insignificant position, but at the same time the new state of Czecho-Slovakia has secured a capacity of 1,000,000 tons of pig iron per year. By the peace treaty Hungary lost all of her iron ore mines and is now entirely dependent on foreign importations. Furthermore, of all her iron works only one plant remains but this is the largest in former Hungary.

Czecho-Slovakia now possesses 30 blast furnaces together with three of the largest steelworks in Central Europe. Austria on the other hand has only 16 blast furnaces remaining. Last year, therefore, we find that Czecho-Slovakia produced 430,000 tons of pig iron, Austria 235,000 tons and Hungary 50,000 tons. In 1921 also Czecho-Slovakia produced 710,000 tons of steel ingots, Austria 250,000 tons and Hungary 90,000 tons. Poland also is a relatively important factor with 250,000 tons of pig iron production and 450,000 tons of steel in 1921. The combined output of the former Austrian Empire last year, therefore, was only 30 per cent of the 1913 production.

Germany's Shrunken Output

Germany, on account of her central position has been affected on all sides by the unsettled conditions of the past three years. Expressed baldly in figures, in 1913 Germany turned out 19,300,000 metric tons of pig iron and in 1920 this output shrank to 5,500,000 tons and in 1921 increased only to 6,250,000 tons; Germany's steel production in 1913 was 18,900,000 metric tons, whereas in 1920 it was 7,700,000 tons and in 1921 8,750,000 tons.

the figures for last year being estimated.

But unsatisfactory as these figures are from the German standpoint, in the writer's judgment they do not reflect the whole situation. The difficulty of the postwar German iron and steel industry lies in the fact that it is no longer self-contained, and up to date no nation has succeeded over any period of time in maintaining iron and steel leadership without being self-contained as to iron ore, fuel and the other necessary raw materials.

German Output Low

Today in Germany the annual capacity of the blast furnaces in existence is about 14,000,000 tons but at the present rate of working the output is only about 8,000,000 tons. In other words about 90 of Germany's 272 blast furnaces are out of action and this takes place at a period when Germany has had very little difficulty in selling her product. It is not a question of markets but of raw materials. Even with her present reduced pig iron output Germany is required to import 1½ tons of foreign iron ore for every ton of pig iron produced. Further increase in pig iron production can come only as a result of a proportionate increase in iron ore imports since Germany's own ores account for an annual output of only a little over 3,000,000 tons of metal. With her furnaces working at capacity, Germany would need about 1.8 tons of iron ore per ton of pig iron, perhaps more, depending on the scrap supply.

The role played by war scrap in maintaining Germany's pig iron production during the past two years has been given too little consideration in outside countries. When the war ended tremendous tonnages of scrap were made available for German blast furnaces and these reserves were greatly augmented by the destruction of war material of all classes under the disarmament clauses of the peace treaty. To avoid using high priced imported ores some German blast furnaces up to the beginning of this year were charging as much as half scrap. The end of the wartime scrap pile is now in sight. As Hugo Stinnes said recently, "Germany must again turn to iron ore as raw material for pig iron manufacture with unsatisfactory results from the standpoint of the cost of production."

The Versailles treaty is therefore having a considerable effect on the world's export trade in iron and steel. Germany has lost iron and steel markets in the far corners of the world which her situation as to raw materials will prevent her regaining for many years. In 1913 Germany led the world in the iron and steel export trade with monthly shipments averaging 516,900 tons. For a brief period last year owing to the scrap situation described before she again led with maximum exports of 242,300 tons in October, 1921. Since this, as the scrap pile has been eaten up, Germany's exports have diminished to an average of 200,000,000 tons per month so far this year.

On the other hand the treaty has enabled France to greatly expand her export trade. France is the only country in the world whose postwar iron and steel exports on the average have exceeded her prewar business. In 1913 her average outgoing shipments were 48,200 tons per month, in 1912 41,5000 tons, and last year, in the face of the world-wide trade depression France's exports averaged 100,000 tons per month.

In some quarters allegations have been made that French iron and steel genius is not equal to organizing the vast resources which the treaty has placed in her hands. Possibly the foregoing export trade figures coupled with the fact that already two-thirds of the destroyed plants in the war zone have been restored may serve to show that these statements have not been wholly true. Nevertheless the French industry has some serious problems to solve among which that of fuel supply is paramount. This brings us to the core of the postwar iron and steel situation in Europe, namely the effect which their mutual industrial necessities may have on the future political relations of France and Germany.

Nearly 70 per cent of the coke used in the blast furnaces in Lorraine comes from German Westphalia. This coke is today around 95 francs a ton at the frontier while Lorraine pig iron is being sold at only 210 francs. At the same time the purely German plants on the east side of the Rhine cannot get along satisfactorily without large quantities of Lorraine ore. This forms a natural basis for workable commercial arrangements and eventually such arrangements will materialize in spite of the political obstacles which may have to be surmounted. It would seem to an outside observer that since the treaty failed to provide France with the necessary fuel to smelt her ores, French Lorraine must inevitably do business with German Westphalia and that therefore reasonably satisfactory political relations between France and Germany constitute a fundamental requirement for the success of the European iron and steel industry.

Investigate Drill Steel

In the course of the drill steel investigation being conducted by the federal bureau of mines in co-operation with the bureau of standards, the bureau states that a preliminary survey is to be made to determine the causes of breakage of steel used in oil stills and in the drilling of oil wells. An investigation of use of steel in the Missouri-Kansas-Oklahoma lead and zinc district and in the southeastern Missouri lead belt also will be made.

Handle Pulverized Coal by Novel Method

Plans for new equipment to be used by the new Cahokia station of the Union Electric Light & Power Co., St. Louis, furnish some interesting information relative to the handling of pulverized coal.

A novel method of weighing the fuel and conveying it from the pulverizers to the boilers is proposed. A series of five blowing tanks will be placed below the floor level of the pulverizing room, which will serve an equal number of pulverizing units. These blowing tanks will rest on platform scales, the dial of which will indicate to the operator in the pulverizing room the amount of fuel in the tank.

The fuel will feed into these tanks by gravity as desired from the fuel bins in the pulverizing room. Each charge will be weighed automatically and then elevated by compressed air to a height of about 75 feet through 4 inch pipes. By means of a simple system of switching valves and parallel distributing mains, cross connected, any blowing unit can discharge into any of the eight enclosed storage hoppers in the boiler house.

The fuel requirements of the first group of units is estimated at 1000 tons in 16 hours. The contract for the equipment has been awarded to Quigley Fuel Systems, Inc., New York.

Investigates Cast Iron for Scale Levers

Cast iron generally is used for scale levers, but it is a difficult matter to obtain a good quality of casting in the larger sizes. Since the levers in the heavy capacity scales are subjected to heavy bending stresses, it is important that the metal used possess great rigidity. While a cast iron piece is not as stiff as a steel one from the same pattern, in actual practice the cast iron casting is stiffer due to the material added to give additional strength.

A representative of the United States bureau of standards recently visited a factory engaged in the manufacture of railroad track scales. Two large scale lever castings had been rejected because the mold had been weakened by burning and distorted by handling. However, when the castings were broken across in two places, both breaks were found to be free from blow holes and flaws.

Reviews Blast Furnace Practice

Quality, Economy and Quantity Are Three Important Objects in Production of Pig Iron—All Can Be Obtained by Following Certain Principles of Operation —Preparation of Materials and Furnace Design Are Discussed

BY A. K. REESE

THAT the mechanical and physical conditions of the materials charged into a blast furnace have a most important bearing upon its successful and satisfactory operation, affecting both its operative conditions and the economy of the results obtained therefrom, is a fact which no blast furnace operator is likely to dispute. One of the essential conditions of satisfactory operation of the modern furnace is that there shall be as nearly as possible uniformity of chemical reactions, and of physical movement of the materials throughout the whole cross section in every zone of the furnace. Two elements are required to obtain this in theoretic perfection, namely, uniformity in the size and density of the materials charged, and a sufficient blast volume to produce the condition of a plenum throughout the whole furnace interior. While it is impracticable, of course, to obtain for blast furnace use materials of perfectly uniform size and density in each of the three classes of materials used in pig iron smelting—fuel, flux and ore—it is practicable to approach that condition by the use of proper means for their preparation.

It is obvious that the feature which most directly bears upon the essential condition above mentioned is that of distribution, and in order to obtain a practicable uniformity of distribution such preparation as will give practicable uniformity of size must be resorted to. For reasons which will be referred to later, uniformity of size only is not sufficient, for example, uniformly large size, while giving uniformity of distribution, would be detrimental to economical operation. The preparation of materials must be in the direction of uniformly small size.

While this principle is much more important in its application to the ore and flux than to the fuel, it also applies to the latter to a degree. As rapidity of action is largely dependent upon rapidity of combustion of the fuel, it is desirable that the fuel should not be charged in lumps of excessive size, and preferably should not exceed 4 to 6 inches. This is assuming, of course, that the coke is of proper physical condition. It may be said here that the physical quality and chemical purity of coke for blast furnace use are of the greatest importance. It should be strong but of not great density, and as low as possible in ash and sulphur. There is nothing which more greatly interferes with the regular and economical operation of a blast furnace than soft, friable, or high ash coke, as everyone connected with the industry has experienced during late years under the conditions existing during and for some time after the war. The disadvantage of high sulphur in the coke need not be emphasized.

Coke Density of Importance

The coke as charged into the furnace should be screened thoroughly to free it from smalls, commonly known as breeze, and should be of sufficient strength to prevent the excessive formation of smalls in the furnace through the crushing effect of the burden. The strength, however, should not be of the kind which is produced by great density, which destroys the cellular structure. A dense coke burns slowly, and is, therefore, inimical to rapid combustion, which is necessary for fast driving, whereas cellular structure permits the heat and the agents of combustion to penetrate readily to the interior of the lumps, thus facilitating combustion. On the other hand, an open cellular structure produced at the expense of strength equally is to be avoided as tending to produce smalls through its lack of resistance to crushing by the weight it has to bear, and abrasion by its movement in the furnace. Such a fuel is also subject to excessive waste in the upper regions of the furnace before it reaches the zone of its usefulness, owing to the greatly increased reaction upon it of the CO_2 in the gases, namely, $CO_2 + C = 2CO$. It is, therefore, of the greatest importance in modern blast furnace practice that coke makers should give the greatest possible attention to the production of a coke combining these two essential features—strength and porosity.

There are a number of factors entering into this problem of blast furnace coke making, by the careful study of which the makers may arrive at the production of coke having the desired physical properties described above. Some of these are the coal mixture, the mechanical condition of the coal as charged and its compactness in the oven, the oven temperature, the rate of carbonization, and uniformity of coking action throughout the coking chamber. It would seem hardly necessary to mention the great importance of chemical purity in the coke, as naturally the higher its carbon content the greater its efficiency. It is surprising, however, how much coke for blast furnace use is produced with high ash and sulphur content; in many cases, undoubtedly, the result of insufficient or inefficient washing of the coal, or insufficient attention to the selection of the coal for the production of blast furnace coke.

Care in selection and efficient washing of coal for coke production, therefore, are of great importance in their bearing upon economical blast furnace operations, and every possible effort should be made by furnace owners to induce coke makers to meet their requirements as to mechanical, physical, and chemical quality. It is the carbon which does the work in the furnace, and every decrease in the percentage of ash increases the available carbon and tends in other ways toward a higher degree of efficiency. In addition to the higher fuel value of low ash coke, it is lighter in weight, requires less limestone for fluxing the ash, and a lower amount of the fuel charged is required for forming and melting the slag produced from the coke ash. It is estimated that the formation and melting of blast furnace slag requires approximately 25 per cent of its weight in fuel, therefore, for every hundredweight of slag produced from coke ash 25 pounds of fuel is lost so far as the smelting of iron ore is concerned.

From the standpoint of preparation, the iron ore is the most important of all the materials charged into the blast furnace, owing to the extremes in mechanical condition, from fines to large lumps, in which most iron ores

From a paper presented at the meeting of the Iron and Steel institute, York, Eng., Sept. 5-6. The author is a consulting engineer, Cardiff, Wales.

are received from the mines, and the great variety of physical characteristics in different ores. The operation of the blast furnace is much more usually affected, for good or ill, by the mechanical condition of the iron ore than that of either fuel or flux. Therefore, it is of prime importance that this condition should receive careful attention, and whatever steps are necessary should be taken, in the way of preparation, to convert it to that condition as will insure the most beneficial effect upon the furnace operation.

Two principal features are affected directly by the condition of the iron ore, both bearing upon the rate of production and upon economy. These are reducibility and distribution. The degree of reducibility of an iron ore depends primarily upon its density, a characteristic which in itself is not altered readily, except with dense ores containing high percentages of protoxide of iron or magnetite, the reducibility of which may be increased by subjecting them to a roasting process in an oxidizing atmosphere, thus converting the protoxide to peroxide of iron.

The rate of reduction in the furnace, however, may be increased materially for any particular ore containing lumps, whatever its degree of density, by increasing the surface area exposed to the action of the reducing agents. The obvious method of attaining this increase in surface area is by breaking the lumps into a number of smaller pieces. The extent to which this operation may be carried is, of course, limited by the cost of breaking the ore and the tendency of any particular ore to produce an excessive proportion of fines in the breaking. The latter tendency, however, really does not exist to any considerable extent in ores whose condition allows of their being broken at all, for whatever smalls may be produced in the breaking usually are of sufficient size not to be classed as fines, and, therefore, may be charged into the furnace safely with the larger products of the breaking operation.

Area Exposed Affects Economy

The increase in the rate of reduction obtained by thus increasing the surface area exposed to the agents of reduction in the furnace, has, in addition to the higher possible rate of production, an important effect upon economy of production. There are two principal reducing agents in the blast furnace process, carbonic oxide and solid carbon, and it is generally accepted that reduction of iron oxide by carbonic oxide, in the upper zones, is a much more economical reaction than the reduction of iron oxide by solid carbon in the lower zones. It is highly desirable, therefore, that the whole or the greatest possible portion of the iron oxide should be reduced by carbonic oxide gas, and that this reduction should be completed before any lumps of iron oxide have reached the zone where conditions permit, in excess, the uneconomical reaction between them and solid carbon.

Must Increase Reduction Rate

It is obvious that the surest way of attaining this is to so increase the possible rate of reduction of the ore by increasing its surface area, as described above, that the maximum reduction may be effected by the carbonic oxide gas in the upper zones of the furnace. If this precaution of increasing the surface area by breaking the lumps of ore before charging into the furnace is neglected, the larger unbroken lumps will escape through reduction by carbonic oxide gas with consequent waste of fuel, particularly if any attempt be made to increase materially the rate of production by rapid driving. To obtain a high rate of production, with economy and quality, it is therefore necessary to prepare the ores in the manner described.

The degree to which it is commercially practicable to crush an ore depends upon its density. Experience has indicated that all ores should be crushed to sizes not exceeding such as will pass through a 3-inch or 4-inch ring, although ores of great density may be crushed advantageously to even smaller sizes. The standard of 3 or 4 inches, while seemingly rather small for ores of a high degree of reductibility, or "soft" ores, is not determined wholly from the standpoint of degree of reductibility, but also by its bearing upon distribution.

The question of the distribution of ore in a blast furnace is of the highest importance in its bearing upon regularity of operation, this in turn affecting most vitally the economy, quality, and output. This question has been referred to above in a general way in connection with uniformity of action in the furnace, but important as that is as regards all the materials, solid and gaseous, entering into the blast furnace operation, the distribution of the ore is the most important consideration in regard to the solid materials.

In the consideration of this question it is necessary to keep in mind the great essential—equality of action throughout the whole of every cross section of the furnace interior. Except for the fact that the operations are taking place in a vertical shaft of circular cross section, this result would be obtained, theoretically, only with materials of exact uniformity in size and density, but the fact just mentioned introduces a feature which interferes with this theoretical requirement. It is a well known fact that the gases have a natural tendency to ascend next to the walls and would do so to the neglect of the interior if the furnace were filled with materials of exact uniformiy in size and density. It is necessary, therefore, in order to secure approximate equality of action, to have a somewhat greater resistance to the passage of the gases in the materials nearest the walls than in the interior. It is to this condition that the ordinary bell and hopper charging apparatus owes its satisfactory use, discharging the materials as it does in such a way that a greater proportion of the smaller particles remains next to the walls, thus providing the somewhat greater resistance to the ascending gases required there.

In order that this distribution by bell and hopper charging may give the desired result the relation of the diameter of the bell to the diameter of the furnace throat at the stock line is of material importance, as likewise that the falling materials shall first strike the materials in the furnace, when nearly full, at about 18 inches from the walls. The former relation is usually a bell diameter 4 to 5 feet less than the throat diameter at the stock line. The bell angle is usually 40 to 45 degrees, and in some cases 50 degrees.

This method of charging results in the surface of the material in the furnace assuming the shape of an inverted cone with its base about 18 inches from the walls, from which point they slope away slightly to the surface of the walls. The smallest particles lie on the base of the cone, and between it and the walls, together with a portion of the smaller lumps and rubble. The inner slope from the base to the apex of the cone consists of pieces of gradually increasing size with practically only the largest lumps at and near the apex. This description does not, of course, apply to an ore mixture consising of all fines, or of lumps of uniform size, conditions which seldom exist in blast furnace practice, but it does apply to the usual run of ores which consist of a mixture of fines, rubble and lumps.

Ore Crushing Is Necessary

It is obvious that the greater the difference between the largest and the smallest pieces, or, in other words, the

larger the lumps the greater the sorting action above described, and conversely, the smaller the maximum size of the lumps the less the degree of segregation. Therefore, it is further obvious that to avoid excessive segregation, the preparation of the ore by crushing the lumps to smaller, say rubble, size is necessary. The crushing of the lumps prevents excessive segregation in two ways, first, being smaller, they have less tendency to roll down the sides of the inverted cone to the apex, and second, the broken pieces have usually sharp and jagged edges, and therefore have a greater tendency to lodge nearer where they fall, and the movement of the materials to the center is more likely to be *en masse*, carrying a certain amount of smalls with it. It is thus that preparation by crushing materially improves distribution by preventing excessive segregation, which is a condition directly inimical to the application of modern blast furnace practice.

In the distribution existing when the usual run of ores and limestone are charged as received, there is, as described above, a core or column in the center of the furnace consisting almost entirely of the largest lumps, the area of the cross section of this core varying with the size and proportion of lumps to rubble and fines. Between this core and the walls there is an annular ring consisting of a mixture of rubble and smalls, in which the proportion of rubble to smalls gradually decreases until next to the walls there are practically only smalls and fines. As previously pointed out, an essential to regular and economical descent of the materials is perfect uniformity of action of the ascending gases upon the whole of every cross section of the material in the furnace, and while this is an ideal condition which may be impossible of full attainment in actual practice, the nearest possible approach to it is of the greatest importance.

Distribution Must Be Uniform

There can be little approach to such a condition if the ascending gases are forced under pressure through a mass of materials distributed as just described. Little, if any, of the gases will find contact with the closely packed fine materials close to the walls, and the greater proportion will pass up through the more open structure in the center, the core of large lumps, and a small portion only through the annular ring of rubble and smalls. The result of this unequal distribution of the ascending gases is the faster descent of the largest lumps in the center, and a gradually slower descent of the outlying materials. Such a descending movement of the materials of the various sizes is exactly contrary to what is most desirable. Those which descend most rapidly, owing to their slower rate of reducibility should descend most slowly, and those which descend most slowly owing to their high rate of reducibility, should descend most rapidly.

Ratio Is Reduced

Maximum economy and output are impossible under such conditions, for apart from the question of irregularity of movement which almost always results from them, it is necessary to provide an excess of fuel to insure the complete reduction of the more rapidly descending lumps before they enter the melting zone and the rate of driving is limited by their slower rate of reducibility. Any attempt at really fast driving under these conditions so reduces the ratio of ore to fuel which can be carried that not only is the output not increased, but the fuel consumption is greatly increased, with the added danger of the production of low grade iron through unreduced ore entering the furnace hearth from over driving, or irregular descent of the materials.

Under the conditions existing in a furnace charged in the manner under consideration, there is always a strong tendency toward irregularity of movement, or none at all, in the material nearest the walls with a gradual building up on the walls. This building up continues until portions either become permanently stationary, forming scaffolds, or masses break away and are precipitated toward the center and into the actively descending materials and rapidly ascending gases, constituting the well known slip. This procedure is more or less frequent and more or less severe from the small slip, causing temporary production of off grade iron, to the heavy slip or explosion, which either blows off the furnace top, or fills the tuyeres with slag, chills the hearth, "gobbs up" the furnace and puts it out of commission for days, an evil too well known; but to whatever degree it occurs it seriously interferes with the regularity which is essential to the best results.

The disadvantages from the accumulated effects of these conditions are only avoided, and even then not always satisfactorily by periodical partial clearance of the furnace walls by the use temporarily of considerably reduced burdens, or, which is the same thing, by charging extra fuel, at the expense of both economy and output. These evils can be avoided only by the proper preparation of lumpy ores by crushing.

The disturbing effects upon blast furnace operations of the use of any considerable proportion of very fine ores—exaggerating the conditions described under distribution—are too well known to require special emphasis. Although in modern practice furnace design and method of operation havt considerably reduced these effects, such ores are still sufficiently objectionable in this respect to make advisable some treatment to change their character as fines. In this case the process of preparation is the reverse of that for lumpy ores, that is, instead of reducing, it is desirable to increase their size, in order to remove their clogging effect in the furnace, and to prevent their being carried out in excessive quantities into the gas flues by the escaping gases.

Various processes have been introduced for this purpose, such as briquetting, nodulising, and sintering, each of which yields a satisfactory product for use in the blast furnace. Sintering is the more recent process, and has grown rapidly in favor, owing to its lower production costs and the large range of materials which may be treated by it, including blast furnace flue dust, the recovery of which alone in some cases warrants the installation of the process, particularly as in addition to the iron ore recovered, the dust usually carries such an excess of fuel over what is required for its own treatment that a considerable proportion of other fine ore without fuel may be mixed and sintered with it. By these processes, and particularly sintering, many ores which in their natural state are unsuitable for use in the blast furnace, either owing to their mechanical condition or high sulphur content or both, may be rendered suitable.

Flux of Less Importance

Of the solid materials, the flux, being easily acted upon by the heat and chemical reactions and usually forming a small proportion of the mixture, is of less importance in connection with the question of preparation of materials. It is of sufficient importance, however, to receive consideration, as its mechanical condition has a definite bearing both upon distribution and rapidity of action in their bearing on economy. Although the effect is less in degree, it is the same in principle as in the case of the ore, and for similar reasons the flux should be broken to as nearly uniform size as practicable. In practice it has

been found sufficient to break it to sizes not exceeding 4 or 6 inches, or such as would pass through a 4 or 6-inch ring, although there is no disadvantage in breaking it to even smaller sizes. The author has had personal experience with large blast furnaces using oyster shells alone as flux over a considerable period with perfectly satisfactory results, except that there was added to the waste gases a further objectionable feature a bad odor besides their usual asphyxiating qualities.

The only remaining raw material essentially used in blast furnace operation is the air which supplies the oxygen necessary for the combustion of the fuel. Little is to be said with regard to the blast under the heading of preparation of materials, that is, in its bearing upon modern blast furnace practice as distinguished from practice which is not modern, except that the usual custom in the latter is to take the air as we find it, although not always in all its purity. Too little attention usually is paid to this point. Natural air in its purest state has its detrimental constituents, but as a rule little attempt is made to draw the supply for the blowing engines even as pure as it occurs. The proximity of boilers and free exhaust auxiliary machinery and various sources of evaporation, too often charge the air near blast engine houses with quantities of moisture much in excess of that in natural air in its purest state. In modern practice practically all exhaust steam is condensed, and a large proportion of the auxiliary machinery is electrically driven. There is, therefore, little if any opportunity for extraneous moisture to enter the blast engines with natural air. This is a feature of considerable importance, and has an appreciable bearing upon the economy of modern practice.

Air Should Be Treated

Although in view of its lack of more general adoption it has no direct bearing upon the subject of this paper, there is a treatment to which natural air may be subjected for its improvement for blast furnace purposes, which comes logically under the heading of preparation of materials. As a strong advocate of this treatment, the author hopes that a discussion of it at this point will not be considered out of place. This is the question of dry blast, or to be more exact, the treatment of natural air for reducing its hygroscopic moisture to a uniform and low content—a treatment first introduced and practically demonstrated for the first time by James Gayley in 1904. There has been a great deal of discussion and even contention as to the merits of this process. At the time of its introduction a great stir was caused in iron producing centers, and during the following years a considerable number of plants were installed for its use in the United States more particularly and in Europe. Some of these installations still are used continuously, and some are used intermittently in the United States, that is, they are used in the summer months when the moisture content of the air is high and discontinued in the winter months when the moisture is naturally low. In other cases their use has been entirely discontinued.

There is, however, practically unanimous agreement among those who have used dry blast that its use does improve blast furnace results, although opinions differ as to the degree of the economy. The author has had an opportunity during the past 18 months of discussing this matter with representative American blast furnace operators, particularly as to the reasons why the process has not been more generally adopted and its use continued more generally where plants have been installed. The explanation given is that the benefits obtainable from dry blast have been superseded by the great advance in blast furnace results brought about in recent years by improvements in furnace design, and the altered practice following those improvements. In other words, it has been possible to obtain in other ways advantages equal to those derivable from dry blast under the older practice. It may be bold for the author to say in the face of these opinions that he believes this attitude to be a mistaken one, and that if every advantage which can be derived from dry blast is provided for, further improved results are obtainable in addition to those already obtained by the means before referred to.

The author has had considerable experience with dry blast, having used it continuously on two large furnaces during the past 13 years with such satisfactory results that he would have considered its abandonment a step in the wrong direction. It is not his intention to enter here into a discussion upon the advantages of dry blast in detail or in general, but there is one important feature in connection with its use which seems to have been missed by those who have used and abandoned it, either partially or wholly, a feature which in all probability explains the attitude adopted toward it in the United States in conjunction with later American practice and possibly elsewhere. This is the important factor of blast temperature. It is the author's experience, and he believes it is also general experience, that with natural air there is an upper limit to the temperature of the blast which can be used with satisfactory and smooth working for any particular furnace. Any considerable increase beyond this limit causes "stickiness," "hanging," and irregular movement of the materials in the furnace. In his discussions with American blast furnacemen, he was told that this was the case even with furnaces of the latest design, and a particular case was cited at one of the most modern plants in America, where high temperatures of blast were tried with results as above mentioned. The blast temperatures generally used range from 1150 degrees Fahr. to 1250 degrees Fahr., while with clean gas and modern stove design, temperatures as high as 1500 to 1600 degrees Fahr. are obtainable.

Use of Heat Means Economy

The economical advantage which could be derived were it possible to make satisfactory use of this additional heat in the blast, need hardly be emphasized, and any practicable means which would render this possible would confer an important boon upon the iron producing industry. The author's experience is that such a means is available in dry blast, and that it is this further advantage of dry blast added to those which are already conceded it, which if taken advantage of, would settle the doubts of those who are still undecided and convert those who have already condemned it. It may be said that he was in a position to have available temperatures as high as 1600 degrees Fahr., normally from 1450 to 1550 degrees Fahr., temperatures under 1400 degrees Fahr. being considered too low.

In the sense in which furnace design bears upon this article, it refers not to the structural detail of the furnace as a whole, but to that portion only in which the metallurgical operations take place; that is, the furnace proper or interior space, the design of which is known technically as the "lines of the furnace." The terms usually used to describe the lines of a blast furnace divide it into a number of sections, namely, the hearth, which is cylindrical; the bosh, an inverted truncated cone; the shaft, an upright truncated cone; and the throat, in modern furnaces usually cylindrical and extending from the top of the shaft to the top of the furnace.

The principal dimensions of these

sections consist of heights, diameters, the acute angle of the bosh wall to the horizontal and the batter of the shaft wall to the vertical. Each of these dimensions has an important bearing upon all the others and their relation to each other is of the first importance as a factor in modern blast furnace practice; for although they may vary somewhat in their relation, the variations are limited to conform to certain principles, the height of the furnace and hearth diameter being the dimensions which control all others.

Under furnace design the author proposes to outline and discuss these principles and to enunciate as a general law the principle that the output capacity of a blast furnace with a particular set of raw materials is in proportion to the effective bosh area. The nucleus of this law is the "effective," for as will be shown later the maximum effective bosh area is dependent upon the various factors which constitute the principles of modern blast furnace practice.

Modern development in blast furnace design has established the following essentials: *A* shaft batter of 1 in 13.5 to 15; the low bosh; the large hearth diameter; and the steep bosh angle. All of these are, of course, comparative terms in their relation to similar features in the older designs. In the accompanying illustration are shown two furnaces *A* and *B* of premodern lines. Extreme cases have been chosen in order to emphasize the principles under discussion. *C* and *D* illustrate two furnaces of modern lines. Extreme cases have increase further the hearth diameter, and a furnace is now in successful operation with a hearth diameter of 20 feet 9 inches, but in this direction it is sufficient for the present purpose to avoid the extremes.

Cylindrical Throat Advantageous

The upper section of the furnace or throat is, as above mentioned, usually cylindrical in shape and extends to from 20 to 25 feet below the furnace top or 12 to 17 feet below the stock line, the highest point to which the furnace may be filled. The adoption of the cylindrical throat is primarily in order to obtain the desired batter to the shaft walls, although it also has a bearing upon regularity of distribution by presenting to the charged materials an area of the same dimensions for the varying positions of the materials in the throat due to their constant movement. The latter point, however, is not of great importance in the modern furnace plant as the charging appliances are usually, or should be, of ample capacity to keep the furnace fully charged at the highest rate of driving.

No Tendency to Adhere

Within the distance to which the cylindrical throat extends the condition of the materials is such that there is no tendency for them to adhere to the walls or to hang through jam- sufficient to require increased space for their accommodation so as to avoid the danger of restricting free movement. Below this point, however, temperature increase becomes much more rapid and reactions much more intense. In this alteration in condition and temperature, which is progressive as the materials descend, more space accommodation is required for free movement, more particularly because to expansion is added the semipasty and pasty condition and the increased density of the mass through the increasing load bearing down upon it from the increasing weight of superimposed materials. It is probable also that the question of carbon deposition enters into the necessity for greater space accommodation as the materials descend into the hotter and more active regions of the furnace. Hence the necessity for the expanding batter to the shaft walls. It would seem obvious also that the more rapid the descent of the materials into and through these zones, the greater must be the increase in space accommodation.

In the older furnace designs with slower driving, shaft batters as low as 1 in 26 and possibly less were in use. In modern practice it has been found necessary to increase this batter to 1 in 14 or thereabout. The principles involved in this feature of modern blast furnace design are of the greatest importance and probably explain in part why many furnace managers have failed in their attempts to apply fast driving to furnaces with lower shaft batter.

To revert for a moment to throat diameter, there are in this feature several opposing conditions to consider. The lower the velocity of gases as they leave the furnace top, the lower the loss from flue dust carried over with them. The largest possible throat diameter, therefore, is desirable for this reason. On the other hand, the extent to which this feature may be provided for is limited by the question of distribution, both of the materials charged into the top and the ascending gases as regards the most uniform action of the latter over the whole cross section of the former. The throat diameter also is limited by the required shaft batter and the bosh diameter and height. Therefore sacrifices must be made in one direction or the other, and as the question of losses by flue dust largely is affected by regularity of stock movement, features tending to the latter should have first consideration. Throat diameters thus are restricted in modern furnaces of 85 to 95 feet in height to from 15 to 17 feet, the controlling factors being the other dimensions such as hearth diameter, bosh diameter and height.

The low bosh was the direct outcome of attempts to increase blast furnace outputs by increasing the volume of blast blown per minute. These attempts with the old high bosh furnaces resulted in seriously increased furnace irregularities, the reason for which became apparent from the study of the altered conditions brought about in the furnace through the more rapid driving, and the troubles experienced. With the much more rapidly descending materials it was found necessary that the contracting part of the furnace, that is, the top of the bosh, should begin below the upper limit of the zone of fusion in order to prevent the pasty materials just above the zone of fusion entering the contracting area, where they would be subjected to a squeezing action as a result of the resistance of the bosh walls, and the weight of the superimposed materials, with the consequent tendency to pack and cause hanging and the formation of scaffolds on the upper bosh walls.

Bosh Lowered by Driving

The continued lowering of the top of the bosh followed therefore the continued attempts at faster rates of driving for larger outputs, until in modern practice a bosh height for 85 to 95-foot furnaces, of 10 to 12 feet above the top of the crucible, has been adopted as compared with as much as 30 feet in the old design. While it is true that no one would build a furnace with a 30-foot high bosh today, there are furnaces in operation of recent design with boshes 16 to 18 feet or even higher. Any attempt to drive such furnaces rapidly is sure to result in increased irregularity and consequent failure. The basis of the low bosh principle is, therefore, that the furnace must be so designed as regards bosh height that the expanding portion of the furnace, that is, the shaft, shall continue to a point slightly below the beginning of the melting zone, so that no pasty materials shall enter the contracting portion at the top of the bosh.

In actual practice most modern furnaces are designed with a cylindrical section from 5 to 8 feet in height be-

tween the lower limit of the expanding shaft and the upper limit of the contracting bosh. This section has no justification from the standpoint of any principles involved in its adoption, except that it fills up with brickwork the angular space at the junction of the bosh and shaft, which to a degree may be considered dead space, and renders less abrupt the transition from the expanding shaft to the contracting bosh, but is rather the result of necessity in order to obtain the desired relation between other features such as shaft batter, throat diameter and bosh diameter and height.

The bosh diameters, for what may be called full-sized blast furnaces, from 85 to 95 feet high are usually from 20 to 23 feet with a bosh angle of about 80 degrees, while in premodern designs this angle was anything from 68 degrees or less to 74 degrees. The latter feature is the result of the progressive increase in hearth diameters, and as will be shown further on, these two features, the steep bosh angle and the large hearth, are concomitant, and their evolution the result of efforts to overcome irregularities through the failure of earlier designs to bring into operation the maximum effective bosh area, which of course, is the full bosh area.

In the modern full-sized furnaces hearth diameters are normally from 16 to 18 feet, although, as has already been mentioned, in one instance this dimension has reached 20 feet 9 inches. At present, however, the latter may be taken as an extreme, and it remains to be seen whether hearths of this size are likely to be generally adopted. In the process of evolutionary experiment it is often necessary to overreach the maximum in order to ascertain what it really is.

Output Determines Hearth Diameter

The hearth diameter of a blast furnace would seem to be the determining factor for its output capacity, and in the sense that it is the starting point in the design and with the bosh angle and bosh height now generally adopted in modern design practically determining the bosh diameter, it is so. But in the sense that the hearth diameter together with the low bosh and steep bosh angle merely are means for making effective the maximum bosh area it is not really the determining factor. The hearth, or more properly the crucible, is the receptacle for receiving and storing from cast to cast the molten materials, while the bosh area is the active area in which the molten materials are produced as such, and the proportion of that area which is in active operation is the determining factor as to the quantity of molten materials available for collection in the crucible.

In all previous references to the various dimensions of the modern blast furnace and the principles which have led to their adoption, it is assumed that in the operation of the furnace the volume of blast is in keeping with the size of the furnace, and is such as will provide the operating conditions upon which those principles are based. In modern practice the volume of blast blown is normally from 40,000 to 50,000 cubic feet of free air per minute delivered from engines capable of delivering these volumes against pressures, or rather resistances, up to 25 or 30 pounds per square inch, to provide ample reserve power for conditions causing abnormally high pressures. Normal working pressures are usually between 15 and 20 pounds.

The term effective bosh area is used several times in the foregoing, a new one in blast furnace nomenclature, but it is one which has a meaning of the first importance in blast furnace operations. Earlier in the paper the author enunciated a general law that "the output capacity of a blast furnace with any particular set of raw materials, is in proportion to its *effective* bosh area."

Before discussing this proposition it is necessary to define: 1. What is the "effective bosh area?" and to consider, 2. what are the factors which control or determine the effective bosh area? and, 3. What bearing have these factors through their determination of the effective bosh area upon the output capacity of the furnace?

1. The effective bosh area is that portion of the full horizontal bosh area at its maximum diameter which is in normal activity under the conditions of operation of the furnace.

2. The factors which control or determine the effective bosh area are those which are under discussion in this paper, namely, the condition of the materials charged, the furnace lines and the volume of blast blown per minute in relation to the size of the furnace.

3. The bearing these factors have upon the output capacity of the furnace is that they determine the area of activity in the melting zone.

The whole trend of evolution in blast furnace practice has been in attempts to devise means of increasing output capacity consistent of course, with quality and economy, and the degree to which these attempts have been successful in modern practice has been due to the influence the factors in increasing the ratio of effective bosh area to the maximum or designed bosh area of the furnace, or to put it in simple terms *to keeping the walls clean.* It is, therefore, conversely true that the effective bosh area of blast furnaces, where the factors upon which modern practice is based have not been adopted or which are not operated in conformity with its principles, is less than the maximum or designed bosh area.

As has been described under preparation of materials, the direct tendency of lack of such preparation is toward restriction of active area in the furnace. Under furnace design the tendency of the high bosh and the low stack batter is shown to be toward restriction of active area in the furnace. Equally the tendency of the small hearth and flat bosh angle is toward restriction of effective bosh area, owing to the removal of the area at and adjacent to the top of the bosh near the walls too far horizontally from the upward moving gases, with the consequent tendency for accumulation of torpid or stationary materials in that area.

Under Blowing Reduces Output

As previously described, for a furnace of given size insufficient blast volume to ensure equal activity throughout the whole cross section at every altitude tends to the production of inactive areas owing to the impossibility of providing perfect uniformity of materials. The greater this lack of uniformity, the greater this tendency. The under blowing of a blast furnace is one of the most fruitful causes of reduction of effective bosh area, with outputs far below maximum output capacity.

The tendency of a blast furnace is to adjust its active areas to the volume of blast supplied to it. This tendency is in strong evidence where furnaces which have been blown for a considerable period with comparatively small blast volume, have been suddenly and too quickly supplied with a considerably increased volume. Operators who have made this experiment will doubtless recall the difficulties they have experienced through irregular working. The author knows of cases where, although the furnace size was quite suitable to the increased blast volume, the attempt has been abandoned through the conclusion that conditions were not suitable to faster driving, whereas a little persistence would probably have overcome the difficulties met with by the walls gradually clearing, and the furnace thus adjusting itself to the larger blast volume.

It is true, of course, that many

blast furnaces in operation today are not adaptable to modern practice in its fullest sense. One or more of the necessary factors are lacking and, as the author has attempted to show, each of these factors is so dependent upon the others that they must all be present for its full application. Among them, however, there is one, preparation of materials which if adopted alone would provide conditions which would render possible the partial application of others with decided improvement in results and tend to remove many of the difficulties which are being experienced at the present time.

(To Be Concluded)

Using Steam from Waste-Heat Boilers

WASTE in many manufacturing operations now is so great that one wonders why it is allowed to continue on such a vast scale. Possibly the chief reason is that the cost of stopping it nearly equals, or even overbalances, the advantage to be gained by conserving. One of the greatest sources of waste in the malleable iron foundry is the heat which is allowed to pass up the stack of the air furnace in which the metal is melted. Losing only a few hundred degrees of its temperature to the metal in the furnace, the gas passes into the stack at a temperature high enough to melt iron. This is illustrated in air furnaces used in the gray-iron foundry which are built so that iron can be piled in the base of the stack to be melted by the outgoing gases.

Similar design is not used in the malleable-iron foundry but some companies have found it economical to install a waste-heat boiler between the stack and the furnace. Here is shown the expense entailed in saving what otherwise would be wasted. Enough advantage must be secured from the boiler to compensate, for the depreciation and interest on the money it required to install it. Some upkeep must also be charged to the boiler. Again a use must be found for the steam generated, or it is of no commercial value. One of the difficulties is that heat is not maintained in the furnace at all times. This can be overcome to an extent when two or more furnaces with waste-heat boilers are operated in the same shop.

In the winter the steam may be used to heat the foundry during the day, but an auxiliary heater must be provided to keep the foundry warm during the night. However, this need not be large as the foundry which will have been warmed by the waste-heat steam in the day only need be prevented from cooling below the freezing point at night. Too, when working full, the fire is started in the furnaces quite early in the morning. Operating an engine for driving machinery is also another use sometimes found for the steam from the waste-heat boiler. If no machinery is used, the steam can be utilized to operate an air compressor as practically every foundry which has two melting furnaces is equipped with a compressed-air system.

A third use is in heating core ovens. This can be done quite satisfactorily and although a slower process than drying cores at higher temperatures which can be attained with an oil or coal fire, the steam heat has the advantage that cores are never burned when it is used, as the temperature usually does not rise much above 250 degrees Fahr.

The accompanying illustration shows a row of steam-heated core ovens at the plant of the Dayton Malleable Iron Co., Dayton, O. This company has two of its melting furnaces equipped with waste-heat boilers and utilizes the steam, among other things, for heating some of its core ovens. Ten ovens, each with four compartments, are installed. The ovens are 16 feet wide, having four doors 4 x 6½ feet. These ovens, built by the Ohio Body & Blower Co., Cleveland, are 30 inches deep. Each of the eight racks is formed by eight 1-inch pipes running lengthwise in the oven and carrying approximately 80 pounds of steam. Gas burners, one of which is shown at *A*, are installed near the floor of the ovens, and gas is used at times in the summer to boost the temperature. As the company uses natural gas the shortage in winter precludes its use at that season of the year.

The light cores now used in the production of malleable-iron castings, as shown by the illustration, allow of a lower heat for drying than if heavier cores were required. The illustration also shows two types of trucks used in the core department. The truck at the extreme left is a barrow equipped with two motor-cycle wheels having the usual pneumatic tires. The tray for the cores is bolted at one end to the barrow, and the other end rests on two elliptical springs supported by the frame. The pneumatic tires and the elliptical springs minimize the jars which the cores receive in being trucked about the department. The second truck is made of a frame of angle iron set on four wheels. This supports, on four elliptical springs, a second frame with a channel iron, supported by two steel bars, bolted to each end. These channels extend below the frame of the truck and so control the end motion of the upper frame. Each is equipped with three malleable-iron castings so that bars may be laid from one end to the other. Four of these ⅝-inch bars form each of the three shelves for the cores. The truck is guided by four handles, two attached to each channel. The rear wheels are on fixed castors while the front wheels which are rubber tired are pivoted on the castors so that they may swing adequately to guide the movement of the truck.

EIGHT 1-INCH STEAM PIPES CARRYING STEAM FROM THE WASTE-HEAT BOILERS FORM EACH OF THE EIGHT SHELVES IN THE CORE OVEN AND SUPPLY ENOUGH HEAT TO DRY THE CORES

New Spirit Guides Management

True Democracy in Industry Is Underlying Principle of System Which Treats Worker as Intelligent Personality—Remuneration Is on Basis of Efficiency and Quality of Product—Mutual Benefit System Successful

BY WILLIAM BAUM

INDUSTRY is emerging from a period of depression and is heading for better business in all lines, but the future is only the beginning of a long price decline and intense competition. Tremendous problems are before us which have mainly to do with cost reductions and the handling of labor. Under the stern scrutiny of the recent period of depression when cost sheets were studied with the greatest care, high costs became more visible giving managers a new impetus to study the better use of equipment, material and manufacturing methods.

During the time of unemployment when workers were glad to secure a job at any price, many companies not only neglected to pay attention to labor but actually forgot what had been learned during the war. Employment managers, service workers, time study men and industrial engineers were discharged to reduce overhead expenses and many workers accepted wage cuts for fear of unemployment. Employers had the upper hand. Now, wheels of industry are turning again and were it not for the fact that employers must look for the highest return of wages, we need not be concerned with labor troubles. Wages could be raised as was done during the war and the workers satisfied. In some quarters, increases have been made voluntarily but this was done as a matter of expediency and by no means represents the coming trend of wages.

Wages will come down with prices in spite of sporadic increases, and what will be the result? Workers will lie down on the job fearing that they will not receive a proper share of the reward. Their attitude will be detrimental to all efforts directed toward reduction of costs. Waste and inefficiency will prevail. The lack of understanding and appreciation of present business conditions on the part of average workers will make it only more difficult for the manager to avoid dangerous rocks and cliffs.

What explains the state of mind of the worker and how should we meet our problems? We must consult the historical development of industry before we can come to an intelligent understanding of the so-called labor problem. In his opera, "Die Meistersinger von Nurnberg," Richard Wagner tells of apprentices during the period of simple industry when the master made a pair of shoes to order, fitting each customer individually. Two or three apprentices lived in the master's home as members of the household. They were promoted to journeymen and masters after having served faithfully three or four years. They owned their tools and took pride in workmanship. Their creative instinct became developed. In the community, their social position was respected and they held high offices of trust.

Large-Scale Production Enters

The middle of the eighteenth century witnessed the beginning of large scale production. Important inventions were made, opening new markets. But with the introduction of power-driven machines, steamships, railroads, telegraph and telephone, the work became specialized and impersonal. Scientific schools with engineering courses were developed to the highest degree of perfection. The factory output assumed bigger and bigger proportions. Without the management being aware, the mental attitude of the worker underwent a change, his pride in workmanship waned and he felt himself an impersonal cog in the wheel. The consequences of these changes are felt today.

Production capacity increases more and more and outruns the rate of increase of markets. Wages are the only incentive for the workers. The markets tighten. Large equipment exists for large scale production with enormous overheads. We have reached the industrial situation of yesterday and today. The management sees itself confronted with mistrust and misunderstanding in the minds of labor. Many companies still maintain a belligerent, repressive and domineering attitude toward their employes. We know that war, even in industry, is expensive, destructive and wasteful. Industrial peace rests on a new philosophy of management, and on a new responsibility toward labor.

This new spirit in management does not believe in the master and servant relation, but upholds the government of true democracy in industry. This new spirit does not believe in guesswork and arbitrary rules but upholds exact knowledge of facts. It believes in treating each worker as an intelligent personality, paying him on the basis of efficiency and quality of product. This new spirit promotes free feeling between management and workers through frequent personal intercourse and establishes an industrial democracy through well established methods, rendering unionism unnecessary, preventing strikes and removing the causes of social unrest.

The new spirit in management expresses itself first of all in plant standardization, that is, the installation of the best machinery and tools compatible with economy, overhauling of existing machinery, the study of material and the determination of the most effective feed and speed of machinery. Standardization aims at a continuous straight line production, relocation of machinery and stock, elimination of fatigue, waste, false motions and duplication of efforts. It defines managerial functions, responsibility and authority and simplifies record keeping, accounting and the preparation of reports. It introduces purchasing by specification in accordance with actual needs and at economical rates, determines the correct amount of stock on hand, improves the care and delivery of tools and analyzes sales methods to stabilize the markets of production. Modern management believes in the application of science to industry through time and motion studies for rate setting and planning, placing a greater responsibility upon the management and restoring individual responsibility long lost in a regime of mass production.

Modern management records the production of each individual worker and recognizes personal efficiency not only through increased wages but also through acknowledgment on bulletins, in house organs and by other means. This knowledge of the degree of individual efficiency enables the management to handle intelligently transfers, lay offs and promotions. Accurate unit direct and indirect labor costs are established each week and compared with standards. This weekly control of costs permits effective means of promptly removing or lowering excessive costs. Also spoilage and waste are compared with standards and incentives are provided for indirect workers, machine adjusters, overseers, foremen and superintendents. Similar principles are applied to office organiza-

---

From an address before the Cleveland chapter of the Society of Industrial Engineers, Sept. 12. The author is president of William Baum & Co., Milwaukee, consulting and industrial engineers.

tions where unusual opportunities often exist for economies and improvements.

Based on Economic Principle

The new spirit in management believes firmly in the fundamental economic principle that low labor costs are not inconsistent with high general wages. While the trend of lower wages cannot be disputed, it should be remembered that so-called cheap labor is expensive. Where the cost of material is high as compared with labor cost, high wages often are justified on account of saving in material. Where labor cost is a big factor, high wages often reduce the waste of human efforts. Wages must be considered high if they do not return value. They should be measured in terms of production; cutting of wages is wrong if it increases cost.

The best means of providing high general wages at low costs is a proper system of wage compensation. Paying for time worked is obsolete, uneconomical and unjust as the good and poor workers may receive the same remuneration. The piece rate system frequently has failed due to cutting of rates causing "soldiering" and due to insecurity of the job and the emphasis which it lays on quantity rather than quality of production. The Gautt, Emerson, Halsey and Bedaux systems of wage compensation are modern and each has its sphere of application. They will be successful if they are based on accurate analysis of the job and are humanly applied. The one which renders the greatest service individually and collectively is the best.

The company with which the writer is connected has had unusually good experiences with the Baum gain-sharing plan which recently was made the subject of an investigation by the bureau of commercial and industrial relations of the University of Wisconsin. Quoting from this report the introductory and concluding lines are as follows:

"Problem confronting company before the installation of a labor control system:

1. Labor turnover.
   a. Rather large; found employes quitting on the least provocation. Lack of satisfaction because of unfair wage.
2. Wages.
   a. Lack of standardization.
   b. Lack of proper relation between group wages.
   c. Lack of recognition of good work, of quality of production over that that of quantity.
   d. No scientific rate setting.
   e. Lack of an adequate incentive toward better production.
3. Production.
   a. Operatives had become rather lax and great amounts of imperfect work were going through the mill. Employes were trying to 'put over' what they could. When attention was drawn to specific cases, knowledge of the imperfection was denied. The company had no means of fixing responsibility.
4. Lack of esprit de corps.

Results of the Plan and Conclusions as to its Value.

1. Effect of gain-sharing on the
   a. Employes. General satisfaction and and good feeling, increase in weekly wages, appreciation of the recognition of quality of work as well as quantity, a keen interest in the work.
   b. Foremen. Get better grade of work; employes have greater interest in the company; greater efficiency means greater income to a foreman since he also is on the gain-sharing basis.
2. Production increased.
   a. Gross production increased.
   b. Reduction of imperfect work.
3. Cost reduction.
   a. Elimination of waste.
   b. Stimulation of laggards by foremen.
   c. Greater efficiency done to standardization of operations.
4. Equalization and standardization of all wages in the shop."

The new spirit in management also manifests itself in giving workers a voice in the determination of working conditions through workmen's representation plans, such as work councils and committees. A unique plan advocated and installed by the same company was described in the July issue of Babson's *Labor Bulletin*, having found successful application in public utilities, coal mines and factories. The originator of this plan is J. D. Mortimer, formerly president of the North American Co., New York. The bulletin explains the plan as follows:

"Several times during the past two years attention has been called to a chain system of Mutual Benefit associations, engineered by a firm of Chicago industrial engineers, and emanating from Milwaukee. The introduction of the system in the plant of the Real Silk Hosiery Mills, Indianapolis, enables us to call attention to the plan.

"So far as the benefit provisions of the organization go, they are the usual sick an death benefits familiar to all who have had to do with Mutual Benefit associations. The funds dispersed are obtained from contributions, or dues, paid by the members, and from equal contributions on the part of the firm. Member dues are 75 cents per month for Class A members, and 50 cents per month for class B members. The benefits derived, varying for the two classes, run, for sickness as high as $150, with an additional equal sum for total disability. Death benefits are $100, $50 of which may be advanced for funeral expenses or for sickness expenses in the period preceding death. The dues of members are deducted from their pay.

Directors Are Elected

"The government of this association is vested in a board of directors, chosen by popular election, one to represent each department of the shop, nine such departments being designated. These employe directors choose from their number four to act on an executive board and the company appoints four others to make up this board of eight. The president and secretary are employe members and the vice-president and treasurer are firm members.

"The president appoints an industrial council of eight members four of them employe directors and four firm directors. This council passes on all matters relating to working conditions, wages, hours of labor, or other industrial matters, wherein controversies arise between employes and employers. These complaints are investigated by the employe members of the council and if they are worthy, they are presented to the entire council. The association in this Indianapolis company, in others formed under the same supervision, undertakes to keep the company supplied with suitable labor candidates, from whom the necessary recruits to the employe force may be chosen. This proviso takes the place of the employment office. The only cost to the company is the office of the employes' employment bureau and the cost for the services of the employment agent.

"The distinguishing feature of this plan consists of tying up the mutual benefit part of the program with an organization that in most respects constitutes a special form of works council or shop committee. In many of our older industries the Mutual Benefit association, or some kind of employes' mutual insurance, is in existence and has been for a long time. In such cases, the shop committee idea could not well be grafted on, without disturbing well-established machinery. The plan is possible, then, mainly for firms which have, as yet, undertaken none of this kind of work.

Surplus Is Invested

"The funds of the association are carried in banks and any accumulated surplus is put into real estate or other mortgages or other first class securities, as determined by the officers. Here appears the western predeliction for real estate mortgages. As long as the funds are slight, the method named is alright. With large funds, some more definite limitation on the investment should be found. These are trust funds and should be handled as such, if indeed they should not be handled as insurance funds are handled in most of our states.

"We are inclined to think that the shop committee features of the plan might well be compared with the various forms of straightaway shop committees and amplified in accordance with what has been found to be the best practice. Nevertheless, the shop committee movement still is new in this country and it may be that a retreat from some of the more highly developed forms of shop committee may come as the result of further trial. Our idea is that the longest lived shop committee and the best one, is the one which gives the employes the greatest amount of real responsibility and which lays down with great care the exact scope of authority.

"It may be found wise to tie up the shop committee idea with the mutual benefit plan. One case of sick or death benefit gives a vitality to the idea, which runs through the entire plant. This is the selling point of group insurance. Somebody must die to make the employes take to it. We therefore commend to those who are thinking of shop committee organization this idea of hitching it up with a mutual benefit association or with group insurance. This plan may give interest to a shop committee, in cases

where the mere shop committee organization does not rapidly take hold."

The object of modern management "is to secure the maximum necessary production with a minimum of effort and friction and with proper regard for the health and happiness of the great body of workers." The new spirit in management manifests itself in bringing about better relations between labor and capital through a kind but firm policy based on fairness, the square deal and the Golden Rule. Where this spirit prevails, it brings back what industry lost since the period of simple industry; the pride in workmanship, the joy of achievement, and the desire to serve for the common good of every one concerned.

Welds Chilled Iron Roll Electrically

BY C. J. HOLSLAG

MANY people, including engineers, are working under the impression that in the process of electric arc welding of cast iron the inserted studs are placed in the break for the purpose of entangling the metal of the weld with the parent metal. That in fact they correspond to the wooden skewers stuck into a piece of meat before it is placed in the oven, or that they function in the same manner as the pegs in a shoe. The correct design of studs and the theory of their use formed the subject of a paper presented by the author January 18, 1921 before the Metropolitan section of the American Welding society, New York. The paper was published in the February, 1921 issue of the *Welding Engineer*.

The use of a copper-nickel alloy, either plain monel metal, or as we have found, one of its derivatives, with a copper nickel content, renders the process of welding cast iron cold, entirely feasible and does not leave any hard spots or layers. This alloy produces a weld with the strength of steel, but the deposited metal may include gas bubbles and pockets. To prevent this formation the welding must be done slowly and this feature together with the cost of the nickel electrode almost prohibits the process for large jobs. However, it has been found that this desirable alloy may be restricted to a few points on the weld and the remainder of the space may be filled with reasonably priced steel. Thus, the alloy may be sued to fill in the first layer, the last layer, the joints, or, a spot where a hole is to be drilled. In this manner the machineable qualities will be as desired and the weld will have all the rugged strength of steel welded to studded cast iron. Many of the theories on cast iron welding recently were carried into actual practice in the welding of a chilled cast iron roll.

The roll, 5 feet long, 22 inches diameter, was provided with a bearing 18 inches long, 14 inches diameter at each end and a gear extension on the end of each bearing about 15 inches long and 11 inches diameter. The break ocurred at the point where the neck joined the body of the roll. The broken surface was perfectly clean indicating that there was no defect in the iron and the accident evidently was caused by the roll becoming jammed while the remainder of the roll train was in motion. The roll was hollow, steam heated for rubber work and therefore the weld had to be steam tight as well as strong.

The smaller part was placed in the lathe and the broken end turned down approximately to a 54 degree angle. The main part of the shoulder was cut to approximate a V by the use of the electric arc with about 600 amperes. This made a nice chilled surface, even more chilled than the outside of the roll and rendered welding easy. However, the chilled surface had to be chipped in spots where the studs were placed later. Three rows of studs, staggered about 2½ to 3 inches apart, were inserted in each side of the V surface. With an electrode specially adopted for cast iron welding, each of these studs was merged into the face of the V before the parts were put together. The entire surface to be welded practically was covered with steel before starting to line up.

The body of the roll was set up on end and anchored firmly, then the upper part was lowered from a chain block and lined up by holding straight edges on two sides 90 degrees apart and drifting them around the circle until alignment was perfect. All welders will determine whether the job is, or is not, going to remain in line. In this case, due to the chilled surface there was no chance of remachining and the job had to be perfect at the conclusion of the welding operation. Two men, one on each side simultaneously made the first few deposits. The men worked 180 degrees apart and then 180 degrees apart again, but only 90 degrees from their first weld. After these first Vs were put in the two parts of the casting were found to be out of alignment by 3/32-inch. By welding on the side to be pulled down and by driving chisels on the opposite side the casting was pulled back straight at a time when enough metal was deposited and cooled to prevent any further distortion. From this point the job was comparatively easy and consisted in running beads around parallel to the circumference of the roll. The reason for running the beads parallel instead of across the break, is because of the lesser expansion and contraction of the width of the bead, compared with the length.

The gap was built up approximately to size with special steel electrodes. The edges were left open and filled in with a special copper-nickel electrode which has the property of being machineable when deposited cold. When the casting was set up in a lathe to true the bearings the extraneous welding metal was cut down to the original size of the casting. This job bears out several theories. Studding allows arc welding to really weld to the cast iron. If this weld had only engaged the steel studs the steam would have leaked at both joints. By the use of studs to make the stretch come in the steel instead of the cast iron, or along the edge of the joint, the weld held throughout. Chilled cast iron can be welded. Welding parallel instead of across the break to lessen the resultant expansion and contraction, worked out perfectly in this instance. The work was done by two men with all possible speed and with a 5/32-inch electrode and yet the chilled surface on the casting was not affected.

From the Journal of the American Welding society for March, 1922.

Recommends Steel Bands for Freight Packing

An investigation of the best practices in export packing undertaken recently by the transportation division of the bureau of foreign and domestic commerce brought out a number of valuable suggestions from various sources. One suggestion from the freight claim division of the American Railway association advocates the use of steel box strapping as an economical and efficient method of eliminating a large part of the annual loss from pilferage and from inadequate containers, aggregating many million dollars.

A case reinforced with steel binding is

protected against pilferage, not only while in the possession of transportation companies but also in shippers' premises, with teamsters, in public warehouses, and in receiving departments of consignees. Pilferers invariably show a marked preference for unprotected packages. As a rule they must work quickly. Rapid removal of a steel banding is not possible with the tools usually at hand, nor can a cut wire or strap be reunited easily. A mutilated band is immediate notice that a package has been tampered with and every employe handling shipments knows that if the bands are not intact he can not secure a clean receipt.

Wire or steel strapping adds to the strength of a container in a proportion so far above its cost that a box designed to carry its load without reinforcement frequently can be supplanted by one having sides, top, and bottom of the next thinner commonly used box lumber, provided it is adequately reinforced by a wire or strap binder. The result is usually a stronger, lighter, and less expensive box. One company reports that a large percentage of its shipments is strapped, and that since adopting this system its package troubles, both from damage and pilfering, decreased 42 per cent during a period in which shipments increased 20 per cent in number.

Discusses Workshop Practice

Modern Workshop Practice, by Ernest Pull; 671 pages, 5 x 8 inches, cloth, published by D. Van Nostrand Co., New York and for sale by IRON TRADE REVIEW, Cleveland, for $5 net.

This book is to be used as a text by young engineers and students in the technical schools. Many tools and methods used in the workshop are completely described, including many important improvements and developments made during the war. The chapter on measuring tools includes the description and methods of using many of the accurate measuring tools recently introduced by the British manufacturers. Gages and gage systems are discussed in detail, and the many different types of gages illustrated and their uses shown. The subject of materials, which is of great importance to the young engineer, is presented fully, and the various methods of manufacturing iron and steel, including the heat treatment of metals, theory and methods of annealing, and the methods of hardening and tempering steel, are explained carefully. Cutting speeds, feeds, and lathe accessories are dealt with in detail, and about 50 pages are devoted to the important subject of screw cutting.

A great deal of attention has been given to the subject of gears and gear cutting. This branch of the workshop work has been neglected in the past in technical schools due chiefly to the lack of suitable machines, but this difficulty now has been largely overcome, and the examples found in the book are quite practical for instructional purposes involving little loss of material. The book is profusely illustrated with sketches and photographs. While it is realized that the practical part of the engineering study in workshop practice cannot be taught through the medium of texts alone, this book, when studied in conjunction with the actual shopwork, will aid the student greatly in the mastery of modern workshop practice.

* * *

Outlines Work of Bureau

The Bureau of Mines Service Monographs of the United States Government, No. 3. Institute for Government Research; 162 pages, 5½ x 8½ inches; cloth; published by D. Appleton & Co., New York and for sale by IRON TRADE REVIEW, Cleveland.

With the idea of listing the multifarious activities of the vast organization of government departments, and to group them in such a way that a clear picture will be presented of what the governmental departments are doing, the Institute for Government Research has undertaken the publication of a series of monographs. These monographs are prepared according to a uniform plan. They give: First, the history of the establishment and the development of the service; second, its functions, described not in general terms, but by listing its specific activities; third, its organization for handling these activities; fourth, the character of its plant; fifth, the laws and regulations governing its operations; sixth, financial statement showing its appropriations, expenditures and other data for a period of years; and finally, a full bibliography of the sources of information, official and private, bearing on the service and its operations.

In the preparation of the monograph, it has been the aim to produce documents that will be of direct assistance in the administration of public affairs. To executive officials it offers a means of obtaining valuable information regarding the details of their own service as well as the service so closely related that a knowledge of all will tend to greater efficiency. The bibliography contained in the book gives a complete list of the works which deal directly with the history, activities and organization methods of the bureau of mines, which will meet the needs of the person who cares to make a further study of the services from the administration standpoint.

* * *

Defines Clay Product Terms

Clay Products Cyclopedia 1922; 252 pages, 8¼ x 12 inches; cloth; published by Industrial Publications, Inc., Chicago, and for sale by IRON TRADE REVIEW for $3 net.

Detailed information and definitions regarding every step that is required to change raw clay or shale into the material for the many purposes for which it is used, is found in the latest edition of this book. The definitions cover over 100 pages and describe the processes, materials and pieces of equipment used. The statistical section, which is indexed, is a valuable time saver for

the executive in searching for necessary data. The book is well illustrated.

A valuable feature of the book is called the departmental index of plant equipment. In this index are listed the numbers of all items that are used or concern each department. The numbers of the items refer to the definitions and in this way the reader easily can find all related topics and determine the one best adapted to the use in mind. The catalog department contains information regarding the equipment and materials manufactured by the different firms supplying the industry. The cyclopedia combines in the one volume information that the clay products manufacturer otherwise would be compelled to search through various catalogs, reference and technical books in order to obtain.

* * *

Lists Manufacturers

Directory of Massachusetts Manufacturers; 674 pages, 5¾ x 9 inches, published under the editorial supervision of the Associated Industries of Massachusetts by Sampson & Murdock Co., Boston, and furnished by IRON TRADE REVIEW, Cleveland, for $6 net.

This directory was published upon the suggestion and request of the Associated Industries of Massachusetts in order to facilitate the conduct of business with Massachusetts manufacturing companies. Four sections comprise the book. The catalog section contains a representation of the leading manufacturers, giving such detailed information about each as the buyer would need. In the alphabetical section is given the corporate or partnership name, officers, capital, products, location, etc., of all Massachusetts manufacturing plants. The geographical section lists the manufacturers and products by towns. The products section gives an alphabetical list of the products manufactured in Massachusetts and the names and addresses of the manufacturers. The publishers expect to publish future editions of the book on alternate years.

Describes Illumination

"Daylight, the Natural Illuminant", is the title of a book published recently by the Skybryte Co., Cleveland, describing the superiority of daylight over any artificial means of illumination. The subject of adequate and proper lighting has increased in importance in recent years but practically all information given to the public has been on the subject of artificial lighting. It is the purpose of this book to point out the superior points in using daylight as a means of illumination. According to the publication, daylight is the natural illuminant. Its special character is that for which the eyes have become fitted since the atmosphere tempers its quality by filtering out the harmful radiations.

Daylight is the standard for discriminating colors. By adequate glass areas properly maintained, it provides greater intensities of illumination indoors more economically than can be obtained by artificial means. Adequate illumination of the proper quantity and diffusion has been found to decrease accidents and spoilage and increase production, and to make workmen more cheerful. Daylight also has the ability to further safeguard the health of the worker by killing germs. The appendix of the book gives a few technical features of daylight lighting for those whose desire to inquire further into the importance of the subject.

Survey Estimates Saving in Superpower Plan

The United States geological survey recently has issued a lengthy report on the proposed superpower system between Boston and Washington. The economic purpose of the project is to conjoin the hydroelectric supply with the steam supply in order to produce the maximum of energy at the minimum investment of capital and at minimum operating expense, and at the same time to conserve as much as possible the rapidly disappearing coal of the Appalachian fields.

According to the report the market for the superpower energy will be furnished by the electric utilities, the industries, and the railroads. It is estimated that the total electrical energy required in this territory in 1930 will be 31,000,000,000 kilowatt hours and that this energy could be supplied by the co-ordinated system such as described in the survey report at an annual cost of $239,000,000 less than by the uncoordinated system which is now in use. The total investment in generating and transmission facilities for the superpower system will be $1,109,564,000, of which $416,346,000 will represent the value of existing facilities to be incorporated in the new system.

In a study of the 96,000 manufacturing establishments located in the superpower district, it was shown that by 1930, through the maximum economical use of the purchased electric energy, $190,000,000 could be saved annually above the fixed annual charge against the capital investment of $185,000,000 to provide the motor equipment necessary to receive the use of this power.

There are 36,000 miles of railroad in the superpower zone, of which 19,000 miles can be electrified profitably. By 1930 this electrification would cause a saving of $81,000,000 as compared to the cost operation by steam. The present industrial demand for energy that cannot be satisfied because of difficulties in the local electric utilities in financing extensions and the future demand for energy that will result from the more economical generation of energy under the superpower system are the two factors discussed at length in the report.

Recommend Standards for Electric Drills

Suggested standards and practices governing portable electric drills are listed in a recent report made by the tool section of the Electric Power club, Kirby building, Cleveland. The rules, which are proposed as adopted standards or recommended practice, were approved by the tool section at its Indianapolis meeting.

It is proposed that a portable electric drill be defined as a "compact semienclosed electric motor in combination with mechanical features so designed and constructed as to be applicable for drilling and reaming in wood or metal more or less intermittently." The standard voltages for direct current electric tool motors shall be 115,230, and 550 volts, while the standard voltages for polyphase alternating current tool motors shall be 110,220 and 440. It is recommended that the standard voltages for universal electric tool motors be 115 and 230 volts. The Standard frequencies for polyphase alternating current tool motors shall be 60 cycles and electric tools equipped with universal motors shall not be guaranteed for operation on frequencies higher than 60 cycles.

To provide for varation from the rated voltage, all motors shall operate successfully at normal rated load at any voltage more than 5 per cent above or below the name plate rating, but not necessarily in accordance with the standards of performance established for operation at the normal rating. The report also contains specifications governing performance, temperature rise, name plate marking and standard sizes.

Study Trade Catalogs

Trade catalogs and their makeup are being investigated by a committee of the Special Libraries association, of which Lewis A. Armistead, librarian, Boston Elevated railway, Boston, is chairman. The purpose of the investigation is to make a general study of the problem of organizing the trade catalogs and to make more available the type of information which they contain. The committee has been subdivided into four committees, each investigating one of the following problems: Accessibility, content, form, classification.

Engineers Will Observe Management Week

Meetings of engineers will be held all over the country during the period October 16-21, which will be nationally observed as management week under the joint auspices of the American Society of Mechanical Engineers, the Taylor society and the Society of Industrial Engineers. Charles M. Schwab, Bethlehem Steel Co., Bethlehem, Pa., and Dean Dexter S. Kimball of Cornell university, Ithaca, N. Y., will be among the speakers at the Middle Western meetings centering in Chicago, Indianapolis, Cleveland, Cincinnati, St. Louis, Davenport, Toledo and Columbus. A topic of discussion for management meetings. Mr. Schwab will be the principal speaker at the Indianapolis meeting, Oct. 18, which will be held in the Claypool hotel. The New York meeting will be held in the Engineering Societies building, 29 West 39 street, Oct. 17.

The Boston engineering group will gather at two meetings to be held at Harvard university on Oct. 19.

Chicago will observe management week on Oct. 18, at a noon meeting of the Chicago Association of Commerce at the LaSalle hotel, and in the evening at a meeting in the Auditorium hotel. A third meeting will be held on Oct. 20. Dean Kimball will speak in the following places: Pennsylvania State college, Oct. 16; Cincinnati, Oct. 19; Columbus, O., Oct. 20. Several Connecticut cities will hold management meetings. Mr. Alford will speak before the Meriden branch of the American Society of Mechanical Engineers on Oct. 16, New Haven branch, Oct. 23 and meetings also will be held by the New Britain and Waterbury branches. A dinner meeting will be held in Atlanta, Oct. 24. The speakers will be Prof. W. W. McLaureine of the Georgia School of Technology. "Factory Management" will be the topic of the Colorado engineers at a Denver meeting at the Metropole hotel, Oct. 27. The Cleveland Engineering society will join with the other participating societies at a meeting on Oct. 17. John Lyle Harrington, of Kansas City, Mo., will address the Associated Engineering societies of St. Louis on Oct. 20.

Other meetings will be held at Baltimore, Birmingham, Ala.; Philadelphia, Minneapolis, Lincoln, Neb.; Portland, Ore.; Plainfield, N. J.; Providence, R. I.; San Francisco, Syracuse, Seattle and Roanoke, Va. The engineers of Western Washington will gather at the Engineers club, Seattle on Oct. 20, when the Syracuse meeting will also be held. The Providence meeting will take place Oct. 1.

News of Societies

Past and Coming Meetings of National and Local Trade and Technical Organizations

IN CONJUNCTION with the twenty-eighth annual meeting of the National Hardware association the auxiliaries of that association, the metals and automobile accessories branches will hold a meeting at the Marlborough-Blenheim hotel, Atlantic City, N. J., Oct. 17 to 20. Members of the parent body will discuss market conditions, evils of price inflation, overhead expense, increasing turnover, etc. Thursday afternoon will be devoted to the metals branch. During this session two papers will be read as follows: "The Department of Commerce Under Secretary Hoover," by H. H. Morse, United States bureau of foreign and domestic commerce, Washington; "Sheet Copper Situation," by W. A. Willis, Copper and Brass Research association, New York. Discussions will be held on the subject of sheet steel and the eaves and conductor pipe situation. A motion picture is to be shown entitled "Lightning Proof Qualities of Metal Roofing," by Robert H. Lyon, Lyon, Conklin & Co., Baltimore. Committee reports will include trade development, less than carload lots and sheet copper.

* * *

National Founders To Meet

The fall meeting of the National Founders association is to be held Nov. 22 and 23 at the Astor hotel, New York. The program has not yet been completed.

* * *

Ohio Foundrymen Plan Convention

Announcement has been made recently that the annual meeting and convention of the Ohio State Foundrymen's association will be held at Middletown, O., sometime after Nov. 15. The two day sessions will be followed by a banquet and entertainment. The directors of the association have approved the suggestion for the establishment of a non-ferrous department.

* * *

Heat Treatment Discussed

At a joint meeting of the mechanical section, Engineers' Society of Western Pennsylvania, and the American Society for Steel Treating, Oct. 10, at the William Penn hotel, Pittsburgh, G. W. Pressell, chief of the research staff, E. F. Houghton & Co., Philadelphia, discussed "The Heat Treatment of Steel." Mr. Pressell told in detail of experiments made in connection with various forms of heat treatment.

* * *

Adopt Resolutions on Europe

At a recent meeting of the New York section of the American Institute of Mining and Metallurgical Engineers held at the Machinery club a resolution was passed unanimously favoring the abandonment by America of its policy of isolation and participate immediately in the economic rehabilitation of Europe. The prevalent idea was that this step should be undertaken not only as a humanitarian movement but to assist Europe in achieving economic stability.

* * *

To Hold Switch Exhibit

Under the auspices of the Philadelphia section of the Association of Iron and Steel Electrical Engineers a safety switch congress and exhibit is to be held at the Majestic hotel, Philadelphia, Nov. 4. About 25 manufacturers of safety switches for 600-volt service and below, including motor starting switches of the across-the-line type only and limit switches for cranes are expected to exhibit. P. T. Vanderwaart, New Jersey Zinc Co., Palmerton, Pa., will read a paper.

Convention Calendar

Oct. 9-14—American Mining congress, twenty-fifth annual convention, new auditorium Cleveland. J. F. Callbreath, 84 Munsey building, Washington, is secretary.

Oct. 17 to 20—National Hardware association with auxiliaries, metal branch and automobile accessories branch at Marlborough-Blenheim hotel, Atlantic City, N. J. T. James Fernley, 50 Arch street, Philadelphia, is secretary.

Oct. 18-20—Society of Industrial Engineers, national convention and exhibition at the McAlpin hotel, New York. George C. Dent, 327 South La Salle street, Chicago, is business manager.

Oct. 27—American Iron and Steel institute, twenty-second general meeting at the Commodore hotel, New York. H. H. Cooke, 40 Rector street, New York, is assistant secretary.

Nov. 22-23—National Founders' association, fall meeting at the Astor hotel, New York. J. M. Taylor, 29 South La Salle street, Chicago, is secretary.

Tool Builders Urge Friendship

President of National Machine Tool Builders Association in Meeting at Lenox, Mass., Urges Greater Co-operation Between Members—Markets, Standardization, Salesmanship, Advertising and Dealers Problems Discussed—Officers Are Elected

LENOX, Mass., Oct. 7.—Commending the past work of the members and urging renewed hope and continued co-operation for the future, August H. Tuechter, president of the National Machine Tool Builders' association, opened the twenty-first annual meeting of that organization at the Aspinwall hotel, Wednesday. Friendship among machine tool builders was emphasized as one of the most important results of the association's activities.

"While we must continue to improve in matters of accounting, cost keeping, statistics, and the other branches of activity in which we are now engaged," said Mr. Teuchter, "we want friendship to be the keynote of this convention, and it is for that reason that we have called the members together for a strictly family gathering. Is our association practical? Some members may think that the things we are proposing to do are day dreams, but I believe we can make our association as effective in every way as any other association. I might recall," continued Mr. Teuchter, "some of the association's recent activities. We have engaged expert cost accountants to lay out general principles to which the cost systems of our members should be brought to conform. The recent depression has in many cases prevented members from adopting this system, but now that we feel the worst is over members should seriously set about getting their cost systems in line with the principles accepted. Then there is the problem of necessary cost of idleness. We must recognze the fact that the machine tool industry requires a considerably greater maximum capacity compared with normal demand than other industries. Of course, if we cannot correct this peculiarity to the industry, we must take care of it in prices of tools sold. Our customers will always be protected by the law of supply and demand, but steps should be taken to eliminate abuses in trading. Taking advantage of the natural weak position of the machine tool industries, unscrupulous buyers have not hesitated to use threats and falsehoods, and part of the work of this organization is to point out a better way of doing business."

In concluding his remarks, Mr. Teuchter pointed out the many hopeful signs for the future of the industry. The worst depression in history has been successfully weathered, excess stocks have been reduced, and the way to better business is clear. The convention was well attended, 77 companies being represented. Thursday officers were elected as follows: President, E. J. Kearney; first vice president, Winslow Blanchard; second vice president, O. B. Iles; treasurer, James N. Heald. Directors, A. H. Teuchter, C. Wood Walter, H. P. Welles, H. W. Dunbar, R. N. McLeod.

Most of the discussion at the meeting was in the form of round table conferences on such subjects as markets, standardization, salesmanship, advertising and dealers' problems. Members representing different groups or divisions of the machine tool industry met one afternoon in different rooms to bring to a focus the work on standardization which has been going on for some years, and afterward all groups had an open session on standardization.

The principal papers delivered at the convention were the following: "Self Respect of the Machine Tool Trade," by William A. Viall, secretary of Brown & Sharpe Mfg. Co., Providence, R. I.; "Conditions That Create Unprofitable Prices," by O. B. Iles, president of the International Machine Tool Co., Indianapolis; "Unfair Competition," by James Hartness, president, Jones & Lamson Machine Co., Springfield, Vt.; "What Patents are Worth to the Machine Tool Industry," by J. K. Schofield, of Niles, Bement, Pond Co., Boston, and "Dealer Problems,' by Paul E. Thomas, president, Kempsmith Mfg. Co., West Allis, Wis.

Says Law Has Triumphed Over Trade Unions

In a talk on labor versus the law, to members of the American Plan association of Cleveland, Thursday, Oct. 5, Walter Gordon Merritt, counsel for the League of Industrial Rights, declared the United States has just emerged from one of the most important epochs in its history, with the fundamental law of individual liberty secure against all attack. For 25 years, the speaker said, organized labor has battered at the principle of individualism as laid down by the authors of the constitution. It has tried in many ways to subordinate the individual to the doctrine of collective power; has tried to overrule the rights of the free worker, the employer and the public—and the end has been a series of decisions by the Supreme Court, reinforced by public opinion, establishing for all time in this country the basic principles through which the country been able to acquire its present strength. The speaker narrated the essential features of famous court decisions involving organized labor and traced the efforts of such labor to warp the constitution and the law to gain its purpose, resulting in the ultimate triumph of American citizenship. He said the American people may well be proud of the Supreme Court for the decisions whereby it has held this country true to traditions. In contrast, he described conditions in England, where compulsory organization has resulted in placing trade unions beyond process of law.

Adjudication must become the rule for the settlement of all industrial disputes involving the welfare of the public. He alluded to the Kansas industrial court, saying that he favored the plan for the settlements of such disputes as the railroad and coal strikes, but not for controversies limited to private enterprises. He advocated the court plan "only in extreme public emergencies."

The simple plan of employe representation, carried out with the secret ballot and in good faith by all concerned, he said, was the most effective measure at hand today to educate employers and employes to one another's viewpoints. Employers have the greatest opportunity ever presented to them, and a great responsibility to the country, to conserve the principles now generally recognized. If they are to make full use of this opportunity the factory must become a university, not only for the training of the hand at the lathe, but for the education of the worker in economics. More than 1,000,000 employes today are working under employe representation, this representing the growth of the system within the brief period of the last five years.

The luncheon at which Mr. Merritt spoke was well attended and was the first of a series planned for the discussion of industrial and labor problems. The American Plan association is making an advertising campaign for the open shop in Cleveland. Among those at the speaker's table last Thursday was the chief of police of Cleveland, who was introduced to the guests and was applauded for what he has done toward the assurance of law enforcement.

August Exports Continue Decline

Iron and Steel Shipments Drop 12,000 Tons from July—For Year To Equal 1921, 171,753 Tons Monthly Required—Imports Also Decrease 12,000 Tons—Pig Iron Receipts 35,933 Tons in Two Months

CONTINUING the slump which set in last June, exports of iron and steel in August declined more than 12,000 tons from the July total and registered only 144,264 tons, within less than 11,000 tons of the year's low mark, 133,333 tons, of last February. For the eight months of the year, the total stands at 1,466,775 tons. In order for the full calendar year's exports to equal the 2,153,788 tons exported in 1921, the rate for each of the remaining four statistical months will have to be 171,753 tons. The monthly rate so far in 1922 has been 184,597 tons.

The heaviest losses in individual tonnages in August this year were reported in black steel sheets which totaled 6290 tons as against 12,829 tons in July; rails, 17,658 tons as compared with 29,919 tons; and barbed wire, 6828 tons as against 10,038 tons. Compared with these major reductions, which total 22,010 tons, is the increase in structural steel of 16,178 tons from the 8738 tons exported in July. This was the only large gain in any individual tonnage in the month.

Imports fell off in August, dropping to 32,010 tons from the 44,285 tons received in July, the highest point since November, 1920. Pig iron declined 1700 tons, scrap fell 708 tons and bar iron 9500 tons, the greatest drop of all. Ingots, blooms and billets gained 3000 tons but rails fell by more than 3000 tons. Wire rods and sheets and plates were lower also but tin plate made a slight gain.

While pig iron imports were smaller than in July, the month's total was 17,105 tons, bringing the aggregate for eight months to 62,332 tons as against 18,028 tons in the same period last year. Of this year's iron imports, 35,933 tons, or more than half, was brought in during July and August.

IMPORTS AND EXPORTS

Gross tons

	1922 Imports	1922 Exports	1921 Imports	1921 Exports
Jan.	10,511	155,822	15,784	516,447
Feb.	10,216	133,333	3,650	387,900
March	8,612	206,474	14,492	210,451
April	15,884	197,562	4,847	160,921
May	17,292	229,616	10,915	140,987
June	24,101	216,298	8,258	117,864
July	44,285	157,027	10,060	84,615
Aug.	32,010	144,264	8,149	74,673
Sept.	.....	.....	11,743	94,650
Oct.	.....	.....	10,609	106,466
Nov.	.....	.....	9,296	125,492
Dec.	.....	.....	9,400	134,348
Total	155,517	1,466,775	117,203	2,153,788

Year	Imports	Exports
1920	421,274	4,934,087
1919	322,264	4,397,295
1918	169,110	5,338,019
1917	330,201	6,465,053
1916	328,965	6,110,732
1915	282,396	3,532,564
1914	289,775	1,549,554
1913	317,260	2,745,635

FERROALLOY EXPORTS

Gross tons

	August 1922	August 1921	Eight months ending August 1922	Eight months ending August 1921
Ferrosilicon	28	..	277	218
Ferromanganese	76	5	984	418
Spiegeleisen	..	..	289	...
Ferrovanadium	1	..	19	86
Total	105	5	1,569	722

IRON AND STEEL EXPORTS

Gross tons

	August 1922	August 1921	Eight months ending August 1922	Eight months ending August 1921
Pig iron	1,791	2,419	17,564	17,912
Scrap	3,586	1,616	52,884	25,814
Semi-finished steel*	9,353	2,447	76,422	6,773
Iron and steel bars†	17,484	5,437	194,823	22,862
Alloy steel bars	246		4,027	
Wire rods	980	351	34,975	11,314
Boiler plate	325	9,388	11,189	293,297
Other plates	5,769		60,096	
Galv. sheets	9,690	2,354	83,003	43,397
Black sheets, steel	6,290	14,169	188,861	84,630
Black sheets, iron	1,027	(a)	8,589	(a)
Cold rolled strips	423	1,386	3,242	14,780
Hoops, bands and scroll	1,908		19,215	
Tin and terne plate	4,092	2,647	53,546	79,910
Fabricated plates‡	848	25	2,108	7,937
Struct'l steel, plain	18,126		50,402	
Struct'l steel, fabricated	2,205	9,667	14,403	254,477
Other struct'l forms	4,585		15,570	
Rails, over 50 pounds	17,421	4,782	183,673	261,720
Rails, under 50 pounds	237		18,348	
R. R. spikes	714	196	5,171	6,753
Track fastenings and material	1,553	(a)	19,090	(a)
Boiler tubes	1,149		7,702	
Casing and oil line pipe	2,290		31,791	
Welded black pipe	4,980	10,537	51,663	299,221
Welded galv. pipe	2,675		21,080	
Malleable iron pipe fittings	740		5,514	
Cast iron pipe	1,185	2,930	11,826	40,745
Cast iron pipe fittings	911		5,474	
Plain wire	3,677	1,075	25,506	47,836
Galv. wire	4,775		61,260	
Barbed wire	6,828	974	47,447	21,345
Manufactures of wire	2,054	(a)	17,646	(a)
Cut nails	195	7	2,774	595
Wire nails	2,355	1,024	44,516	18,408
Other nails incl'd'g tacks	368	219	3,209	3,462
Bolts, nuts, rivets and washers	1,429	1,023	11,866	20,473
Total	144,264	74,673	1,466,775	1,583,661

*Include ingots, blooms, billets, slabs, sheet and tin plate, bars and skelp.

†Includes rods other than wire, and light structural forms.

‡Ship and tank plates punched and shaped.

(a) Formerly by value.

IRON AND STEEL IMPORTS

Gross tons

	August 1922	August 1921	Eight months ending August 1922	Eight months ending August 1921
Pig iron	17,105	2,433	62,332	18,028
Scrap	9,085	2,016	48,045	23,397
Bar iron	619	179	3,909	1,185
Ingots, blooms and billets	3,904	517	14,937	5,596
Structural shapes	355	41	1,698	445
Rails	726	2,874	21,161	14,772
Sheets and plates	55	42	383	1,874
Tin and terne plates	66	....	2,185	308
Wire rods	95	47	1,067	553
Total	32,010	8,149	155,717	66,159

IRON ORE IMPORTS

Gross tons

From:—	August 1922	August 1921	Eight months ending August 1922	Eight months ending August 1921
Spain	7,328	40	28,197	40
Sweden	61,304	13,659	185,952	143,234
Canada	87	179	1,408	1,492
Cuba	54,948	10,692	188,520	107,817
Other countries	36,506	....	130,503	38,173
Total	160,173	24,570	534,580	290,756

IMPORTS OF VARIOUS ORES AND FERROALLOYS

Gross tons

	August 1922	August 1921	Eight months ending August 1922	Eight months ending August 1921
Ferromanganese	15,959	320	69,093	5,801
Ferrosilicon	2,083	1,318	9,159	3,250
Manganese ore	62,121	28,939	272,868	326,342
Tungsten-bearing ore	499	286	1,571	1,142
Nickel ore	...	...	....	1,497
Total	80,662	30,863	352,691	338,032

CASTING AND FORGING EXPORTS

Gross Tons

	August 1922	Eight months of 1922	Eight months of 1921
Malleable iron castings	136	884	
Other iron castings	759	5,994	
Car wheels and axles	1,051	11,504	
Shells and projectiles, empty	...	167	
Steel castings	183	1,373	
Iron and steel forgings	135	1,635	
Total	2,244	21,557	

August deliveries of foreign ferromanganese failed to maintain the rate of reported sales. Imports of this material amounted to only 15,959 tons while in July the receipts were 25,841 tons. Ferrosilicon imports also were lower as were manganese ore and tungsten bearing ore. However, they showed only slight losses from July. The August total of this entire classification was 80,662 tons as against 91,363 tons in July, the difference being practically that shown in the ferromanganese tonnages.

Iron ore imports also were lower in August than in July, the total being 160,173 tons as against 166,741 tons. Spain's shipments to the United States were heavier in August by 2500 tons and Sweden's by 6500 tons.

Steel Treaters and Forgers Meet

American Society for Steel Treating, American Drop Forging Institute and Drop Forge Supply Association Hold Joint Convention in Detroit—Exhibition of Iron and Steel Products and Equipment Attracts Much Interest

PROBABLY the widest representation of the iron and steel industry ever witnessed in this country was assembled at the fourth annual convention and exhibition of the American Society for Steel Treating at the new General Motors building, Detroit, Oct. 2-6. At the invitation of this society the American Drop Forging institute and the Drop Forge Supply association held simultaneous and joint meetings with it during the week. Approximately 1300 members of the steel treating society and 150 members of the forging associations were registered while more than 18,000 people attended the exhibition, which was the most complete conducted by the society. About 100 manufacturers of steel, heat treating equipment and materials, machinery and forged products were represented with exhibits. While the success of this year's meeting was assured largely by the continuous growth of the society, the fact that Detroit, one of the country's leading centers for the heat treating and forging industries, was selected as the meeting place added to the interest.

Features of the program were discussions of practical heat treating problems, sessions on research, employment, metallurgical investigations, production and costs and forging practice. On Thursday a bronze tablet was dedicated to the builders of the first bessemer converter in America. Social functions included a smoker, dance and banquet participated in by the three organizations. Inspection trips to various Detroit manufacturing plants proved to be of interest to many members.

Technical Papers Cover Wide Range of Subjects

TUESDAY morning's session on carbonizing, which was covered in last week's issue, was followed in the afternoon by a meeting of the delegates from the various local chapters of the American Society for Steel Treating. The work of the past year was reviewed in detail and the many achievements were the source of gratification among the delegates. It was pointed out that the low point in membership owing to the business depression apparently had been safely passed and that gains now were being made. Invitations for the 1923 convention and exhibition were received from the cities of New York, Boston, Buffalo, Pittsburgh and Springfield, Mass.

The first practical round table discussion of the convention was held Tuesday afternoon at 4 o'clock, the subject being heat treating. The discussion centered upon a great many problems encountered in heat treating shops and engaged the attention of many practical steel treaters. Suggestions for improvements in the education of machinists and tool makers in heat treatment were offered by Prof. S. L. Goodale, University of Pittsburgh, Pittsburgh, and H. B. Knowlton, Milwaukee vocational school, Milwaukee, in a symposium on vocational education held Tuesday afternoon. It was pointed out that the problem was not so much "how" to teach as "what" to teach in the schools attempting to provide training for young men entering the heat treating profession.

General heat treating problems were discussed at the Wednesday morning session, at which J. Fletcher Harper, research engineer, Allis-Chalmers Mfg. Co., Milwaukee, was chairman. R. B. Schenck, metallurgist, Buick Motor Car Co., Flint, Mich., opened the session with a paper, "Heat Treating in Lead." A paper entitled "Thermal Atmospheres and Their Relation to Formation of Scale" was read by G. C. McCormick, assistant metallurgist, Crompton & Knowles Loom Works, Worcester, Mass. This paper, which appeared on page 854 of the Sept. 28 issue of IRON TRADE REVIEW.

"Thermal Transformations of Some Chrome Vanadium Steels" was the subject of a paper presented by J. S. Vanick, United States bureau of standards, Washington. The final paper was the "Selection of Furnaces for Steel Treating" by C. L. Ipsen, designing engineer, Schenectady, N. Y.

Labor Laws Discussed

The first session on Wednesday afternoon was a joint meeting in charge of the American Drop Forging institute. Labor and the anti-trust law were the subjects discussed. Following this meeting the steel treaters conducted a practical round table discussion on heat treating with John J. Halbing, assistant superintendent of heat treating, Ingersoll-Rand Co., Phillipsburg, N. J., serving as chairman of the meeting. Conducted simultaneously with the round table discussion was an open meeting of the society's standards committee of which T. D. Lynch, research engineer, Westinghouse Electric & Mfg. Co., was chairman. Progress was reported on the work of the committee during the past year.

Tool steel came in for its share of attention at the meeting held on Thursday morning. C. M. Johnson, director of research, Crucible Steel Co. of America, Park Works, Pittsburgh, was chairman. The first paper, "Lathe Breakdown Tests of Some Modern High Speed Tool Steels" by H. J. French, physicist, United States bureau of standards, Washington, and Jerome Strauss, metallurgist, United States navy yard, Washington, was read by Mr. French.

The second paper on the program was "Carbide Segregations in High Speed Steel" by A. E. White, director of engineering research, University of Michigan, Ann Arbor, Mich. The author showed the effect of these segregations on the physical characteristics of the steel. "Effects of Structure upon Machining of Tool Steel" was the title of a paper read by J. V. Emmons,

metallurgist, Cleveland Twist Drill Co., Cleveland. The session was ended by N. B. Hoffman, metallurgist, Colonial Steel Co., Pittsburgh, whose paper was "A Metallographic Study of Hollow Drill Steel."

On Thursday afternoon many members and guests of the society went to Wyandotte, Mich, where the Detroit chapter dedicated a memorial tablet to the pioneers who at that place had built and operated commercially the first Kelly tilting bessemer steel converter in America. This converter had been installed in the old Wyandotte Iron Works, the site of which is now occupied by the Wyandotte public library. Thus the tablet was erected near the entrance to that building. F. P. Gilligan, president of the society, acting as master of ceremonies, introduced as the first speaker, T. D. Lynch, president-elect of the society, who spoke briefly of the aims and purposes of the American Society for Steel Treating. Capt. Robert W. Hunt, Robert W. Hunt & Co., Chicago, and formerly works superintendent of the Wyandotte Iron Works, was introduced as the next speaker. He recalled a number of historical events in connection with the company and William Kelley.

Lt. Col. A. E. White, director of engineering research, University of Michigan, Ann Arbor, Mich., and the first national president of the society presented the dedicatory address, concluding by unveiling the tablet. Hubert Amiot, mayor of Wyandotte, accepted the memorial. At this point, W. C. Kelly of Charleston, W. Va., son of the inventor, was introduced. He told of the pneumatic process developed by his father but patented by Sir Henry Bessemer and in closing disclosed interesting information never before made public but which seemed to substantiate the contention that Kelly was the original inventor of the so-called bessemer converter.

Thursday morning's technical session was continued in the afternoon with A. W. F. Green, chief of laboratory, John Illingworth Steel Co., Philadelphia, presiding as chairman. "Some Failures in Aircraft Plane and Engine Parts," was the title of a paper presented by J. B. Johnson, acting chief material section, war department air service, McCook field, Dayton, O., and Samuel Daniels, metallurgist, air service, McCook field, Dayton, O. The last paper on the program was "Deterioration of Steel and Wrought Iron in Hot Gaseous Ammonia," by J. S. Vanick, United States bureau of standards, Washington. At the conclusion of this session another practical round table discussion on heat treating problems was conducted with Robert Vincent, president, Vincent Heat Treating Co., Detroit, presiding.

One division of the session on Friday morning was presided over by Robert S. Archer, metallurgist for the Aluminum Co. of America, Cleveland. Since H. C. Kneer, metallurgist, Naval Aircraft Factory, Philadelphia, was absent, his paper on "Heat Treatment and Properties of Duralumin" was read by the chairman. Duralumin is a German product made from aluminum, copper and magnesium, which is said to have a greater strength than aluminum. The alloy is suitable for forging, being treated in the same manner as steel but at a much lower temperature. "Rapid Graphitization of White Cast Iron and a Discussion of Resulting Products," by Dr. Anson Hayes, professor of chemistry, Iowa State college, and Prof. W. J. Diedricks, assistant professor of mechanical engineering, was presented by the former.

Discusses Hardness Testing

The second division of the morning session took the form of a symposium on "Hardness Testing," with Maj. A. E. Bellis, president of the Bellis Heat Treating Co., New Haven, Conn., as chairman. The discussion was under the direction of the hardness testing committee of the National Research council.

Dr. H. P. Hollnagel, General Electric Co., Schenectady, N. Y., in a paper on "Significance of Hardness Tests" pointed out some of the faults to be found in the present methods, for example, the scratch, rebound or impact methods, etc., explaining that the time factor was possibly the most important since it entered ino practically every method. A paper by Howard W. German, Henry Disston & Sons, Inc., Philadelphia, on "Hardness Tests of Metals" was read by James J. Curran of the Henry Souther Engineering Co., Hartford, Conn. Mr. Curran also explained some of the tests which have been conducted by his company, on brinell balls. The results of these tests brought out the fact that the hardest possible ball should be obtained for the brinell machine if accurate results are to be obtained. A. D. Flinn, chairman, division of research, National Research council, spoke of the progress which had been made in the engineering work, and of the necessity for changing practices and terminologies in order to meet the march of progress.

One of the most important meetings of the convention was held Friday afternoon when research problems were considered. A. E. White, director of research, University of Michigan, Ann Arbor, Mich., presided. "Governmental Research" was the title of the first paper read by W. M. Corse, vice chairman, division of engineering extension National Research council.

Dr. John A. Matthews, president, Crucible Steel Co. of America, New York, presented a paper, "The Executive and Research," in which he stated that the conception of research is misunderstood.

"Research for Engineering Societies," was the title of a paper read by A. D. Flinn, chairman, division of engineering, National Research council. Mr. Flinn stated that according to the 1920 census, there were 136,000 engineers and 150 technical societies in this country. He also outlined the work of the Engineering Foundation and the National Research council. In closing he announced that within a short time the American Society for Steel Treating probably would be invited to become a member of the Engineering Foundation. The final paper of the session was presented by F. O. Clements, division of research, General Motors Corp., Dayton, O., the title of his paper being "Some Fundamentals of Research."

Social features of the convention consisted of a smoker in the auditorium of the General Motors building on Tuesday evening, a carnival and dance at the same place on Wednesday evening, and the annual banquet at the Statler hotel on Thursday evening. Over 500 members and guests of the American Society for Steel Treating, the American Drop Forging institute and the Drop Forge Supply association attended the banquet at which Charles T. Bragg, president, Michigan Valve & Foundry Co. Detroit, officiated as toastmaster.

Mayor James Couzens of Detroit, the first speaker on the program, welcomed the three societies to Detroit. He was followed by Frank H. Alfred, president of the Pere Marquette Railway Co., Detroit, who presented an illuminating address on American railroads titled "Over Regulation." Mr. Alfred outlined at some length the obstacles confronting railroads, about which the tax paying public knows too little. Mr. Alfred's address will be published in an early issue of IRON TRADE REVIEW. Following Mr. Alfred's paper, Marion L. Burton, president of the University of Michigan, Ann Arbor, Mich., was introduced. His address, "That Mind of Yours," dealing with the proper development of mind and character was extremely fascinating.

Detroit, being the center of the automobile industry in the country, presented exceptional opportunities for the visitors attending the convention to visit several of the leading manufacturing plants. Special points of interest especially heat

treating, forge and foundry departments, were visited under the personal guidance of plant officials. The plants visited were as follows: Cadillac Motor Car Co.; Burroughs Adding Machine Co.; Central Forge & Gear Co.; Ford Motor Co., Highland Park plant; Ford Motor Co., River Rouge plant; Hudson Motor Car Co.; and Lincoln Motor Car Co.

According to an announcement by the national secretary, the American Society for Steel Treating will hold its winter meeting at Chicago sometime in February. The spring meeting will be held at Bethlehem, Pa., in June.

Drop Forgers Emphasize Need of Accurate Costs

THAT the drop forging industry has developed rapidly in a comparatively short time and that the lack of accurate information regarding costs is destructive to intelligent competition were the principal points developed in a comprehensive paper read Tuesday afternoon at the opening session of the American Drop Forging Institute by F. A. Ingalls, Ingalls-Shepard Division Wyman-Gordon Co., Harvey, Ill.

Mr. Ingalls traced the growth of the forging industry from the days of the village blacksmith to the present time, touching upon the introduction of the drop hammer and other important type of forging equipment. He also mentioned the gradual change to quantity production and the resulting modification of forging practice in order to accomodate repetitive work.

The trend of business in the drop forging industry was well illustrated by R. P. Dryer, Scovell Wellington & Co., Cleveland. Mr. Dryer exhibited a number of charts showing the fluctuations in business during the past year. Other subjects pertaining to the business of the institute were presented in papers by Jules Dierckx, Keller Mechanical Engraving Co., Brooklyn, N. Y., and H. N. Taylor, N. & G. Taylor Co., Philadelphia.

On Wednesday afternoon the meeting of the institute was conducted jointly with the American Society for Steel Treating. J. H. Williams, president, J. H. Williams Co., Brooklyn, N. Y., and president of the institute presided. "Some Fundamentals with Respect to the Labor Question" was the subject of an address by Walter Gordon Merritt, New York. Mr. Merritt is the organizer and counsel of the League for Industrial Rights and conducted the successful prosecution of the Danbury hatters' case.

Felix H. Levy, New York, special assistant to the department of justice under Roosevelt and participant in many important proceedings under the Sherman act, delivered an address on "The Menace of the Sherman Act to This Country and How it Should be Amended."

The meeting on Thursday morning was presided over by Ferdinand Barnickol, president, Indianapolis Drop Forging Co., Indianapolis. J. B. Sehl, second vice president, Billings & Spencer Co., Hartford, Conn., chairman of the cost committee, of which C. C. Winn, assistant treasurer, Wyman-Gordon Co., Worcester, Mass., and F. S. Hatch, assistant treasurer, Moore Drop Forging Co., Springfield, Mass., are members, gave a short report on the work which has been completed by the committee.

He also spoke of the necessity of a survey of the forging cost methods now in use, and of the advisability of standard methods. R. E. Waldron, chief engineer, Dominion Forge & Stamping Co., Walkerville, Ont., Canada, presented a paper on "Power Plant Costs in Operating Steam Hammers." "The Flow of Metal in Forgings" was the subject of a paper presented by L. A. Danse of the Cadillac Motor Car Co., Detroit. The paper was written by Harold F. Massey, B. & S. Massey, Ltd., Openshaw, Manchester, England.

Steel Treating Equipment Reflects Advancement

HERALDED as an "international steel exposition," the exhibition held in connection with the convention of the American Society for Steel Treating really was a demonstration of the importance of forging and heat treating in the automotive industry. Housed in the magnificent General Motors building, and in Detroit, the capitol of automobile manufacturing, the exposition never was more appropriately situated.

As outlined briefly in last week's issue more than a score of steelmakers were represented. Motor castings in which an imported pig iron containing nickel and chrome were exhibited by the Bethlehem Steel Co. Tractor wheels fabricated from rolled plates, and tool steel, dies, shear blades and other products also were exhibited. The Witherow Steel Co., Pittsburgh, displayed a number of forging blanks which are rolled to shape. Blanks for drive shafts, housing shoes, valve rods and front axles were shown.

The extensive use of alloy steel was indicated by the large number of exhibits of springs, axles, crankshafts and other automotive parts made of alloy steel. The United Steel Alloy Corp., Canton, O., exhibited crankshafts, chains, axes, shovels, hammers, oil well drilling tools and other products made from open-hearth and electric alloy steels. Crucible and electric steel in the form of tool steel, band saw plates, ball bearing races, magnets, valves, spring wire, tubing, etc., was exhibited by the Simonds Mfg. Co., Lockport, N. Y. Springs, connecting rods, bumpers, steering arms, etc., in which chrome vanadium, chrome nickel or chrome manganese steel was employed, were displayed by the Interstate Iron & Steel Co., Chicago. Moving pictures showing the manufacture of alloy steel, as well as other operations in steel mills, were shown by this company during the course of the exhibit.

Vanadium alloy steels, in the form of files, track tools, dies, taps, etc., were shown by the Vanadium-Alloy Steel Corp., Latrobe, Pa. The booth of the Vanadium Corp. of America, New York, manufacturer of vanadium steel, was fitted up as a rest room.

An interesting exhibit of the materials used in making crucible steel attracted interest to the booth of the Colonial Steel Co., Pittsburgh. The crucibles were shown with the materials packed preparatory to firing, in the course of melting and just prior to tapping. Saw plates were exhibited. The Atlas Steel Corp., Dunkirk, N. Y., newly formed by the combination of the Atlas Crucible Steel Co. and the Electric Alloy Steel Co., exhibited specimens of chrome magnet steel and tool, die, chisel, drill and finishing steel. The Crucible Steel Co. of America, New York, displayed tape lines, saws, welding rods, die steels, tool steels and various shapes rolled at its La Belle Works. An interesting display of refractories used in the laboratory for the analysis and heat treatment of crucible steel also attracted interest.

Crankshafts, springs, gears, pinions and alloy steels were exhibited by the

Central Steel Co., Massillon, O., to emphasize the qualities of chrome molybdenum steels. The many commercial and special uses of molybdenum steel were demonstrated in the spacious booth of the Climax Molybdenum Co., New York. Automotive parts, twist drills, chain, tubing, motorcycle parts, bumpers, disk automobile wheels, shovels, rolls, etc., were displayed to illustrate the wide range of products in which molybdenum is used.

Tool steels and cutlery were shown by several exhibitors. The Haynes Stellite Co., New York, exhibited tools, cutters, lathe centers, guides, knives, surgical instruments, cutters for cloth and asbestos and the model of a hot billet scraper. The evolution as a rest room and emphasis was drawn to the service rendered by this company to the users of high speed alloy steels.

Forgings and die blocks were shown by a number of exhibitors. A Finkle & Sons, Chicago, showed forgings and die blocks made of molybdenum steel, while the Heppenstall Forge & Knife Co., Pittsburgh, showed a variety of die blocks, hammer rams, hammer guides, piston rods, shear knives and miscellaneous forgings. The Tacony Steel Co. with which the Titusville Forge Co. is affiliated, exhibited dies made from a special die steel manufactured by the former company and piston rods, crank shafts, etc. made in the forge shop of the latter company ferrouranium and ferrovanadium. Illustrations of the Panama Canal locks were shown labelled as the first important construction in which vanadium steel was extensively used.

Nickel and copper ingots and other metals were exhibited by the British American Nickel Corp., New York, and by the International Nickel Co., New York. Many nickel steel products including gear shafts, crankshafts, clutch pedals, universal joints, etc., were displayed by the last named company. Uses of its monel metal also were emphasized.

Heat resisting alloys used in carbonizing boxes, annealing boxes, muffles, etc. were shown by three companies—the General Alloys Co., Chi-

A VIEW DOWN THE MAIN EXHIBITION HALL OF THE GENERAL MOTORS BUILDING WHERE MACHINE TOOL EXHIBITS PLAYED AN IMPORTANT PART

of a knife from steel to the finished product was shown by the Firth-Sterling Steel Co., McKeesport, Pa. Specimens of stainless cutlery were displayed and a 7-passenger automobile on which the parts made of alloy steel manufactured by the company were indicated, formed the background for this attractive booth. Tool steels, permanent magnet steel, and commercial alloy steel for crank shafts, gears, ball bearings, springs, etc., as well as special steel for domestic instruments were shown by the Halcomb Steel Co., Syracuse, N. Y. Stainless steel for cutlery and other products, and also tool steel in the form of broaching tools, milling cutters, reamers, drills, etc. were displayed by the Ludlum Steel Co., Watervliet, N. Y. The booth of the Midvale Steel & Ordnance Co., Philadelphia, was fitted up

The American Drop Forging Institute, Cleveland, displayed nearly a hundred forgings illustrating the present status of the forging art. Other exhibits of interest included that of the Standard Steel & Bearings Co. Inc., Philadelphia, featuring ball bearings and their parts; that of the William Ganschow Co., Chicago, showing speed transformers, gears, worms and racks; and that of the Michigan Valve & Foundry Co., Detroit, showing fire plugs and valves. Considerable attention was attracted to the booth of the Standard Alloys Co., Pittsburgh, where an all steel reversible propeller was demonstrated. The propeller displayed is made of a Uranium nickel alloy steel and is claimed to have served satisfactorily in a number of tests. Two small vials of radium were exhibited at this booth as well as samples of

cago; Driver Harris Co., Harrison, N. J.; and the Electric Alloys Co., Elyria, O. Carbonizing boxes of nickel chromium which had been in use for unusually long times were shown by the Driver Harris Co. while the Electric Alloys Co. showed its heat resisting alloy in the form of seamless tubing, strips, receptacles, etc.

Many types of heat treating furnaces and burners were displayed by various exhibitors. In the way of electric furnaces, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., showed a wide range, several of which were in operation. Complete equipment for automatic temperature control accompanied each furnace. An electrically heated lead pot also was in operation. The General Electric Co., Schenectady, N. Y., exhibited one large and two small heat treating and hardening furnaces in

operation each being equipped with an automatic temperature control panel. This company also displayed an electrically heated oil tempering bath.

Electric furnaces for melting nonferrous metals, enameling, annealing and heat treating were illustrated by photographs at the booth of the Electric Furnace Co., Salem, O. Electric gas furnaces made up the exhibit of the Bellevue Industrial Furnace Co., Detroit. Both were provided with automatic temperature controls. Photographs and bulletins at the booth of the George J. Hagan Co., Pittsburgh, illustrated all the types of electric, gas, oil and fuel-fired furnaces made by that company.

Oil or gas-fired furnaces equipped with an electric valve control and in operation featured the exhibit of the Surface Combustion Co., Chicago. Gas burners set in firebrick demonstrated the flame effect of surface and tunnel principles. General heat treating furnaces, a hardening furnace and a crucible furnace were shown by the Chicago Flexible Shaft Co., Chicago. Each was equipped with automatic temperature control and could be operated on oil or gas. Five one-third size models of recuperative-regenerative furnaces were displaced by the Combustion Utilities Corp., New York. An electrically driven gas or oil-fired rotary furnace for treating small parts attracted attention at the booth of the W. S. Rockwell Co., New York.

The Standard Fuel & Engineering Co., Detroit, exhibited oil and gas-fired heat treating furnaces. Another part of the exhibit consisted of firebrick for gas and oil furnaces, refractory cements and carborundums. Oil or tar burners operating on the venturi principle made up the display of the Hauck Mfg. Co., Brooklyn, N. Y. The Liquid Fuel & Engineering Co., Detroit, had at its booth a complete line of multiple spray fuel oil burners both assembled and dissembled to illustrate the atomizing principles involved. The booth of the Ferguson Furnace Co., Toledo, was arranged as a rest room.

Machine tools, machinery, and allied equipment were installed in 16 booths at the exhibition. One of exhibits attracting attention was that of the Keller Mechanical Engraving Co., Brooklyn, N. Y. This company had an automatic die block engraving machine in operation cutting a die block.

One of the most extensive displays of machine tools was that of the Motch & Merryweather Co., Cleveland, every machine being in operation. This company showed a small stamping press; a machine for finishing the threads and knurl in can lids, lamp sockets, etc.; a medium duty shaper; a hobbing machine with an angular velocity testing fixture; machines for testing angularity and curves of gears and cutters; a medium duty drill press; a light drilling machine, a quick locking lathe chuck, a small milling machine with fixtures; and heavy and light duty grinding machines. The Armstrong-Blum Mfg. Co., Chicago, showed an automatic high speed, motor-driven hack saw in operation cutting off given lengths of stock. This company also had in operation two sizes of motor-driven hack saws; a hand punching, shearing and bending machine.

Large models of a grip slide with integral outboard bearing; suspended heading and gripping slides with wedge adjusting liners; by-pass toggles of full automatic grip release; a short and compact forging machine for automotive work, together with a display of forged blanks made up the exhibit of the National Machinery Co., Tiffin, O. The Ajax Mfg. Co., Cleveland, had as its exhibit small models of a forging press and a board hammer in operation. Individual motor drive was a feature of each. A medium duty shaper in operation and typical of a general line of shapers was shown at the booth of the Ohio Machine Tool Co., Kenton, O. A motor-driven universal shaping saw for accurate work and capable of producing a smooth cut was shown in operation by the Peerless Machine Co., Racine, Wis.

Machines in Operation

Goddard & Goddard Co., Detroit, displayed milling cutters including the larger sizes for railroad and slabbing work. Replaceable blades are used on the heavy cutters. The American Twist Drill Co., Detroit, displayed, arranged on panels, twist drills and milling cutters.

An air blast cabinet machine for cleaning work, samples of angular steel grit and metallic abrasive cleaning materials together with small gears cleaned by blast equipment was shown at the booth of the Pangborn Corp., Hagerstown, Md. The Spencer Turbine Co., Hartford, Conn., had installed and in operation a 900-cubic feet per minute turbo-compressor supplying air to the live gas furnaces of other exhibitors. This company also had 100 and 600-cubic compressors. The American Blower Co., Detroit, displayed fans, pressure blowers, utility blowers and domestic ventilating fans.

A three-electrode metal rod heater for stock in lengths from 6 inches and up was in operation at the booth of the American Car & Foundry Co., New York. The company also had in operation a two-path electric heater for forging or upsetting work, and a three-electrode rivet heater. Engine pistons and wire automobile wheels were shown in addition. Charles Kleist & Son, Jamestown, N. Y., displayed drop hammer boards, the feature of which was their built-up construction of sections glued and bolted together. Marking dies, forging stamps and a machine for marking, together with a wide range of stamped metal tags, etc., composed the exhibit of the James H. Mathews & Co., Pittsburgh.

Many types of temperature measuring and control instruments and similar devices were shown by various manufacturers. The Bristol Co., Waterbury, Conn., displayed in operation an automatic temperature control on a gas oven; oil and air and gas and air controls electrically operated; valve controls for oil, air, gas, steam and water; indicating and recording pyrometers; pressure gages and electrical instruments. Leeds & Northrup Co., Philadelphia, had in operation four hardening furnaces operating by the hump method of control. Quenching demonstrations were made.

Small crucibles, thermocouple mountings, pyrometer tubes, recording and indicating pyrometers and automatic valve control for oil or gas furnaces was on exhibit at the booth of Charles Englehard, Inc., New York. This company showed a transformation point recorder. Taylor Instrument Co.'s, Rochester, N. Y., featured indicating and recording pyrometers; thermocouple mountings; automatic temperature controls; an automatic signal device; indicating and recording thermometers; regulators; chemical, molten metal and oil bath thermometers and hydrometers.

Pyrometers, both indicating and recording, automatic temperature control apparatus, pyrometer tubes and mountings were exhibited by the Wilson-Maeulen Co., New York. In addition three sizes of hardness testing machines sold by that company were shown. Specimens of a special metal for electric furnace and heating appliance resistors was one part of the exhibit of the Hoskins Mfg. Co., Detroit. Four types of electric furnaces in operation were shown as well as indicating and recording pyrometers, including one using an electric light signaling system. The Brown Instrument Co., Philadelphia, showed mounted a line of automatic temperature control instruments, and pyrometers for recording and indicating temperatures. In addition, portable potentiometers, signaling pyrometers and pyrometer tubes were shown.

E. Leitz, Inc., New York, had an exhibit of metallographic equipment including a micrometallograph equipped with a new vibration absorber. Other parts of the display comprised general metallurgical microscope equipment, objectives and oculars, grind-

ing and polishing machines for preparation of microscopical specimens. A wide range of metallographic equipment including lenses, objectives, cameras and microscopes for all purposes were shown by the Bausch & Lomb Co., Rochester, N. Y. Large photomicrographs and a machine for projecting the same were displayed. A feature of this exhibit was a new contour measuring projector for checking and measuring screw threads, gears, gear cutters, hobs and special forms.

The Tinius Olsen Testing Machine Co., Philadelphia, displayed several types of testing machines and supplementary apparatus. Among these were an automatic dial indicating machine for testing small coil springs quickly, hardness testing machines, thread testers, impact machines, autographic transverse testing machines and a machine for testing elasticity of wire. The Shore Instrument Co., Jamaica, N. Y., demonstrated scleroscope machines for hardness testing and several optical pyrometers. Several hardening compounds also were shown. The Steel City Testing Equipment Co., Pittsburgh, showed an American alpha brinnel machine and a straight piston type brinnell machine. A power operated brinnel machine and a hydraulic tensile testing machine were illustrated by literature.

Three grades of cyanides for case hardening were shown by the American Cyanide Co., New York, as well as cyanides obtained from the air and used in electroplating work. Due to the rapid absorption of moisture by the cyanides, the products are shipped in air-tight drums, specimens of which were on exhibition. The American Kreuger & Toll Corp., New York, displayed a new case hardening process for surface and pack hardening. A new brinell machine used in the determination of the hardness of materials was shown. Samples of products for pack hardening and cyanide hardening were displayed at the booth of the Case Hardening Service Co., Cleveland. The company introduced a new paint for protecting parts of work against hardening during the case hardening operation.

Case hardening materials for pack hardening, materials for selective hardening and cyanide for cyanide hardening and heat treatment were displayed by the Alfred O. Blaich Co., Detroit. Specimens of auto parts which had been case hardened with these materials were on display. Samples of case hardening materials and luting material were shown by the Rodman Chemical Co., Verona, Pa. Case hardened products, rims for automobiles and samples showing corrosion and scabbing of alloy annealing boxes completed the exhibit. E. F. Houghton & Co., Philadelphia, exhibited carburizing materials, quenching and tempering oils, liquid rust proof preventatives for metals and steam cylinder lubricants. Leather products made by this company for use in the metal industry, such as packings, beltings, etc., were on exhibition.

The Park Chemical Co., Detroit, displayed cyanide hardening compounds, quenching and drawing oils, lead pot carbon for covering lead baths, case hardening compounds for carbonizing and special products. The Dearborn Chemical Co., Chicago, displayed oils for rust prevention, cutting oils, punching oils and metal cleaners. A spraying machine illustrated the method recommended for application of the rust preventative. The different constituents of the oils and cleaners were shown. The J. B. Ford Co., Wyandotte, Mich., exhibited special solutions for cleaning metals, enamel remover and washing sodas, together with a machine in operation showing the method of agitating a solution of metal cleaner with compressed air.

Insulating Materials on Display

Insulating materials in the brick, powder and cast forms for use in boilers, furnaces, etc., were featured at the exhibit of the Celite Products Co., Chicago. Core ovens, high speed furnaces, enameling ovens and similar equipment, which were insulated with materials made by this company, were also shown. Carbonizing compounds, commercial heat treating and case hardening compounds were shown by the Montgomery Chemical Co., Detroit, as well as nonshrinking fireclay to be used in sealing carbonizing boxes and special mixtures for case hardening. Several models of furnaces were on display. Refractory brick, both old and new refractory cements were exhibited at the booth of the Quigley Furnace Specialties Co., New York.

A miniature electric furnace in operation showing the heat resisting qualities of brick for use in ovens, furnaces, kilns and retorts was one of the features of the exhibit at the booth of the Armstrong Cork & Insulation Co., Pittsburgh. Cork insulating material for refrigerator and drinking water systems and insulating material made from diatomaceous earth also were shown. High temperature firebrick cements and boiler baffling were displayed by the King Refractories Co., Inc., Buffalo. Photographs illustrated several installations made by this company. The American Refractories Co., Pittsburgh; showed different kinds of refractory material, silica brick, coke oven and gas retort shapes, chrome brick and cement.

Four grades of high temperature cements for application on various kinds of furnaces, sealing and carbonizing boxes and general boiler work were shown by the S. Obermayer Co., Chicago. Special cements to be used under aluminum melting pots and cements for use where the refractory comes in contact with the cutting action of the flames were also featured. The Keystone Refractories Co., New York, showed high temperature cements and granular refractories for bonding firebrick in metallurgical and other types of furnaces as well as clay for relining old bricks for monolithic boiler wall construction.

Special alloy material for high temperature equipment such as carbonizing containers, annealing boxes, lead, cyanide and salt pots was displayed by the Electro-Alloys Co., Elyria, O. Enamel burning equipment, seamless tubing, ladles for holding molten glass, carbonizing pots for gears as well as carbonizing containers which had already given long service added to the exhibit. The Calorizing Co., Pittsburgh, exhibited a cast alloy recommended for work when high temperatures are required such as furnace parts, heat treating boxes and containers. Metals treated for high temperatures in the form of disks, pipes, lead pots, tubes for superheating steam, air preheaters for forge furnaces, were also shown. The Carborundum Co., Niagara Falls, N. Y., exhibited a variety of materials including various refractory shapes, brick shapes, high temperature cements, linings for heat treating furnaces operating at high temperatures, fire sand for rammed up linings and grinding wheels of various materials and shapes. A high speed heat treating furnace equipment with linings made by this company was in operation.

A new type of air washer designed to purify the air for turbogenerators, mill motors and substations was on display by the Midwest Steel & Supply Co., New York. A small model was in operation. The work of the United States bureau of standards, Washington, was illustrated by pictures showing the general equipment available for research in the metallurgical laboratories of the bureau. Pictures and plates showing studies of properties of metals at high temperatures as well as the typical structure of carbon and alloy steels were exhibited. A feature of the booth was a special recording apparatus, namely a chronograph, for thermal analysis.

Finds Germany on False Economic Basis

Chicago, Oct. 10.—Four months observation of business conditions in Europe has brought Charles Piez, president of the Link-Belt Co., to the conclusion that the apparent industrial prosperity of Germany is on a false basis and that she will not continue to be a formidable competitor of manufacturers in the United States as far as South American countries are concerned.

Observing that his company had been losing contracts in South American countries to German competitors, Mr. Piez sought a reason and found it apparently in the low wage paid the German workman, as measured by dollar exchange. Skilled men are paid 50 to 60 marks per hour, which is 20 to 30 cents per day on the present basis of exchange. The more the mark depreciates the lower the wage measured in dollars. This reduces the cost of the machinery made in Germany. A scheme to pay wages on a sliding scale depending on exchange was found impossible to maintain. On the other hand the German manufacturer finds the cost of his imported raw materials, coal, cotton, copper and other things, is so high that this balances the lower wage.

"Germany is busy," says Mr. Piez. "There is no unemployment, but she seemed to me to be selling below cost. After looking the matter over carefully I have decided she cannot continue to undersell us in world markets or continue as a formidable competitor for a long period. It seems to me like an artificial condition which cannot be maintained long in foreign trade. We all have seen a manufacturing concern apparently busy and prosperous, but at the end of the year facing a heavy money loss. Germany seems to me in that position, really selling below cost.

"England is faced by much unemployment and needs greater foreign trade to busy her workers. A malleable iron company with whose affairs I have been familiar for several years is now losing heavily through shortened operations, for the first time in 40 years. This is true generally."

Mr. Piez believes the debts of European nations to the United States should not be cancelled, especially that of England, which will be able to pay in full. Some of this indebtedness undoubtedly will be lost eventually, but to wipe it off and remove the burden from some of the countries would not be wise.

Wire Company Changes

The Wire Goods Co., Worcester, Mass., has changed its name to the Washburn Co., increased its capitalization to $1,000,000, and adopted the style of divisions for its associated companies. These are the Cassady-Fairbank Mfg. Co., Chicago, and the Andrews Wire & Iron Works, Rockford, Ill. The headquarters in Worcester will be known as the Wire Goods Co. division. The Canadian plant, however, will retain its corporate name of the Andrews Wire Works of Canada, Ltd., Watford, Ont., but its stock is held by the Washburn Co. The company has sales offices in New York and Chicago. Charles G. Washburn succeeds his brother, Reginald Washburn, president.

Settle with Creditors

The long standing litigation over the settlement in the bankruptcy of the Dayton Coal, Iron & Railroad Co. has reached a culmination with the acceptance of a compromise by the creditors. Under the agreement reached, the Tennessee creditors received the full value of their claims, 60 per cent paid in cash and 40 per cent to be secured by deferred payments. The non-resident creditors are to receive 50 per cent of the face value of their claims, without interest, 36 per cent in cash and 24 per cent in deferred payments. The receiver has $408,000, making a total amount of $691,527 now available. The properties of the Dayton Coal, Iron & Railroad Co., after passing into the hands of the Tennessee Electric Steel Corp. were acquired in August, 1922 by the Cumberland Coal & Iron Co. which has headquarters at 149 Broadway, with Arthur M. Wickwire as president. The Cumberland Coal & Iron Co. is operating the coal mines at Dayton and has increased the production to about 400 tons daily. It also is doing some preliminary work with a view to getting a blast furnace ready for blowing in on foundry iron in the near future.

Limestone Is Dutiable

In an article entitled "Ojibway Plant to Resemble Gary", published in IRON TRADE REVIEW of Aug. 17, 1922, it erroneously was stated that "Canada collects no duty on iron ore and limestone."

Limestone, crude, unmanufactures, not fit for flagstone, building stone or paving, is entitled to entry free under tariff item 296 of the Customs tariff of Canada, 1907. When imported crushed or ground, it is rated as enumerated under tariff item 711, which carries a general tariff of 17½ per cent. When otherwise manufactured, it comes under different items carrying various duties.

Indebted Farmers

Partly Responsible for Ammonia Buying Slump—By-Product Prices Hold

New York, Oct. 10.—Sellers of light oil distillates are accepting orders for definite shipment, but not before the middle of November. Production is increasing steadily.

The market is quoted as follows: Pure benzol, 30 cents ovens, in tanks, and 35 cents in drums; 90 per cent benzol, 27 cents in tanks, and 33 cents in drums; toluol, 30 cents in tanks and 35 cents in drums; solvent naphtha, 27 cents in tanks and 32 cents in drums; commercial xylol, 29 cents in tanks, and 34 cents in drums and pure xylol, 20 cents in tanks and 45 cents in drums; naphthalene is nominal.

Trading in sulphate of ammonia is relatively quiet. Many larger consumers are receiving material on 12-month contracts placed last spring, and there is little supplementary buying that usually takes place about this time of the year. This is attributed in a measure to the fact that the farmers have as yet little available cash, and in fact are still heavily indebted to fertilizer companies, although collections are said to be improving. The market on sulphate of ammonia may be quoted at $3 to $3.05, works, on domestic business, and $3.55 to $3.60, port, on foreign.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	(nominal)	$0.30
Toluol	(nominal)	0.30
Solvent naphtha	(nominal)	0.27
Commermial xylol	(nominal)	0.29

Per Pound at Producers' Plants

Phenol	$0.20 to $0.22½
Naphthalene, flake	nominal
Naphthalene, balls	nominal

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.00 to $3.05

Contract

Pure benzol	$0.30
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	nominal
Naphthalene, flake	nominal
Naphthalene, balls	nominal

Per 100 Pounds at Producers' Plants

Sulphate of ammonia (12 months)	$3.00 to $3.05

Canal Traffic Increases

Total tonnage moved on the New York state barge canal system during 1922 up to Oct. 1, was 1,211,484 as compared with 960,588 for the same period last year. Traffic on the canal for the week ending Sept. 30 was heavier than during any other week excepting one.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

ORGANIZATION of the Big Four Fluorspar & Ore Co., to own and operate fluorspar properties in Crittendon county, Ky., has been effected by the Iron Trade Products Co., Farmers Bank building, Pittsburgh. General offices of the new company are maintained with the parent organization. Work has started in the development of the properties and machinery for milling the ores will be installed shortly. Officers of the company are: President, W. J. Strassburger; vice president, J. L. Hukill; treasurer, Louis J. Adler; and secretary, Huntington Downer. Mine offices will be maintained at Marion, Ky., with Avery H. Reed, vice president and general manager, in charge.

* * *

THE F. S. Pearson Engineering Corp., 250 West Fifty-seventh street, New York, has re-established its department for industrial management and technical auditing of industries and public utilities. This department will be carried on together with the company's usual work of financing, developing, designing and constructing engineering projects and industrial plants.

* * *

THE International Combustion Engineering Corp. has bought the entire stock of the Green Engineering Co., East Chicago, Ind., by an exchange for shares of International Combustion. George E. Learnard is president of the International Combustion Engineering Corp. The plant of the Green Engineering Co. will be used as a western production plant for its new owners.

* * *

SAWS are to be manufactured and grinding wheels, files, belting and small tools are to be sold in a new building now being erected for the Albert Griffiths Saw Co., 3 Whittier street, Boston. The building will be 40 x 94 feet, flat roof, brick, 12-inch walls to carry another story to be added probably in the spring; windows with steel sash and concrete floors with wood surface and asphalt between.

* * *

RECENTLY organized and chartered in Illinois, the Risher Fire Brick Co., has its office and warehouse at Eighteenth and Canal streets, Chicago, where a complete stock of high grade refractories will be carried. Attention will be given to special shapes. H. E. Risher is president and treasurer. He has been in the refractories business more than 19 years. The new company will specialize in quick service and engineering advice.

* * *

PULVERIZED coal is to be used exclusively in the boiler plant of the Norfolk & Western railroad at Roanoke, Va., which recently contracted with the Fuller Engineering Co., Allentown, Pa., to redesign and equip the plant. Dryers, pulverizers, conveyors and other equipment are to be manufactured by the Fuller-Lehigh Co., Fullerton, Pa. The plant is to have an initial capacity of 12 tons an hour.

* * *

NEW agents and territories for the machine tool products of the Pawling & Harnischfeger Co., Milwaukee, have been announced as follows: Michigan, except Lake Michigan counties and the extreme northern section of the state, to the Cadillac Machinery Co., Detroit, C. L. Campbell, president; northern section of Ohio, to the Cleveland Duplex Machinery Co., Cleveland, G. J. Hawkey, president; and the lower section of Ohio and Ohio river counties in Kentucky, to the Seifrat-Woodruff Co., Dayton O., and Cincinnati.

* * *

EQUIPPED for making castings in bronze, brass or aluminum in any size or quantity, the Phoenix Brass Foundry, Irvington, N. J., recently completed its new foundry plant. The company maintains a large shop for machining, finishing and assembling as well as a pattern shop for either wood or metal patterns. With office and works at 857-961 Springfield avenue and foundry at Cordier street and Chancellor avenue, the company now is prepared to do floor, bench or machine molding from architectural bronze to production work.

* * *

AKRON, O., will have the largest rim plant in the world, according to officials of the Fireston Tire & Rubber Co., which it is said is to make more than 60 per cent of the total world output each year of automobile rims. The company has announced that its new rim plant in South Akron would be in operation within the next 30 days and that it will have an initial production capacity of 20,000 automobile rims and 4000 solid truck tire bases daily. The present Firestone rim plant, which was the company's first tire plant, will be sold as soon as the new plant 250 x 880 feet is completed.

* * *

MERGER of the American Carbonic Machinery Co. and the Grand Rapids Foundry Co. under the name of the former, is announced by O. R. Roenius, general manager. The two companies have been owned and controlled by the same interests for some time but as the product of the foundry company has been mostly refrigerating machinery and as the sales and engineering organization's name more properly identified the business, the consolidation was made. The company is located at Wisconsin Rapids, Wis., which formerly was known as Grand Rapids, Wis. It capitalization now is $200,000. Ownership of the company largely is in the hands of E. Roenius, Ottor R. Roenius, Fred A. Roenius and Oscar E. Uehling.

* * *

CONVERSION of a large part of the big works of the Samson Tractor Co., Janesville, Wis., for the manufacture of passenger automobiles by the Chevrolet division of the General Motors Corp., which was started Oct. 1, requires the construction of two large new shop buildings. One will be 125 x 500 feet, 1-story, adjacent to the assembling floor building and will be used for the continuous assembly of Chevrolet cars. The other building will be 160 x 600 feet, 1-story, and equipped for manufacturing Chevrolet bodies by the Fisher Body Corp., also a division of General Motors. The two items of new construction will cost $400,000, exclusive of the large amount of machinery, and will be ready about Jan. 1. A. J. Brandt has been assigned to Janesville in general charge of the Chevrolet and Fisher activities.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

CHARLES A. Fitz-Gerald, for 18 years connected with the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has been appointed sales agent at St. Louis for western territory. He was born in Selma, Ala., attending the public schools there and the University of Alabama at Tuscaloosa. After several years service in the transportation and traffic departments of the Southern railway he entered the employ of the Sloss-Sheffield company at Birmingham, in 1904. In 1911 he was made sales assistant at St. Louis.

Thomas Crabtree, president and treasurer of the Park Mfg. Co., Worcester, Mass., has returned from a European trip.

Charles E. Morehouse has resigned as sales manager of the Torrington Co., Torrington, Conn., after being with the company for 25 years.

Joseph H. Shaw, formerly with the Shaw Bros. Foundry, Newark, N. J., has taken charge of the Phoenix Brass Foundry, Irvington, N. J.

D. Glynn Evans, metallurgist of the Llanelly Steel Co., Llanelly, Wales, manufacturers of sheet and tin bars, is visiting various iron and steel works in this country.

B. A. Hansen of the New York office office of the Cutler-Hammer Mfg. Co., Milwaukee, has been placed in charge of a new office opened by the company at 358 Ellicott square, Buffalo.

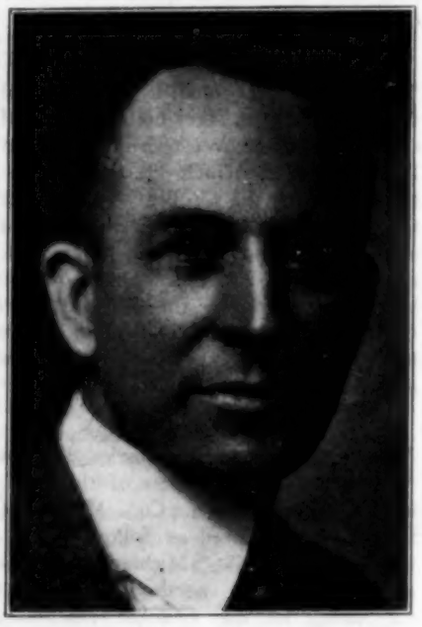
W. H. Robinson has been appointed manager of the interior lighting section of the merchandising department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Charles U. Smith, has been appointed superintendent of the American Malleable Castings Co., plant at Marion, O. Mr. Smith formerly was factory superintendent of the Auto Specialty Co., St. Joseph, Mich.

E. P. Sawhill, who has had nearly 30 years engineering and selling experience with elevators and conveyors, has been placed in charge of the conveyor sales of the Brown Hoisting Machinery Co., Cleveland.

Capt. John F. Blain, head of the Emergency Fleet corporation in the Seattle district during the war, has been named as Northwest representative of the Bethlehem Shipbuilding Corp.

Pell W. Foster Jr. has been appointed New England district manager of the Power Specialty Co., 111 Broadway, New York, with offices at 50 Congress street, Boston. Mr. Pell



CHARLES A. FITZ-GERALD

formerly was in the New York sales office.

F. E. Clark, for seven years with the Heroult electric furnace department, and secretary of the open-hearth committee of the United States Steel Corp., has resigned to become superintendent of the Sizer Steel Corp., Buffalo, effective Oct. 16.

P. C. Idell, who has been identified with the engineering and sales departments of the Babcock & Wilcox Co., New York, for 23 years, has been appointed manager of the New England office, 49 Federal street, Boston.

Ario Pardee has been elected president of the Cranberry Furnace Co., Johnson City, Tenn. Mr. Pardee had been vice president of the company. Hammond Prosser, formerly secretary and treasurer, has been elected vice president and H. F. Noyes has been appointed general manager.

W. T. Bennett has been appointed by Witherbee, Sherman & Co., New York, as their New England agent for the sale of pig iron, with headquarters at 40 Court street, Boston. Mr. Bennett formerly was with the Griffin Wheel Co., Chelsea, Mass., and in more recent years associated with Alley & Page as salesman in the territory in which he now will represent Witherbee, Sherman & Co.

Edward J. Kearney, who long has been identified with the activities of the National Machine Tool Builders association, has been elected president of that organization. Mr. Kearney, secretary and treasurer of the Kearney & Trecker Co., Milwaukee, machine tool builders, served on the Wisconsin war labor board and before that was a member of the state board of industrial education and its successor, the state board of vocational education.

Henry L. Thompson, president of the Bostwick-Braun Co., Toledo, and the W. Bingham Co., Cleveland, jobbers of iron and steel and hardware, and of a number of industrial enterprises, has been made chairman of the Willys-Overland Co., Toledo. He has also been made chairman of the executive committee. He became a director of the Willys-Overland Co. some time ago. Mr. Thompson began his career as a boy with the Bostwick-Braun Co., and rose to the office of president of that company as well as to a position of leadership in the iron and steel and hardware jobbing fields.

W. H. Oliver, manager of sales, Philadelphia office of the Republic Iron & Steel Co., since 1914, has been appointed manager of sales of the eastern territory for the same company with headquarters in New York effective Nov. 1. Mr. Oliver has been associated with the Republic company since 1902. Charles S. McKinley after one year absence succeeds Mr. Oliver as manager of sales in the Philadelphia territory. Mr. McKinley formerly was associated with the Republic company at its Philadelphia and Pittsburgh offices and more recently as assistant general manager of sales at Youngstown, O. Norman W. Foy who recently has been acting as Buffalo agent for the Republic Iron & Steel Co. has been appointed district representative in charge of the company's Buffalo office.

Railroad Tool Buying Continues

Two Middle West Roads Place Fair Sized Orders—Large Lists Are Expected from Pennsylvania and Burlington Lines—General Industrial Demand Is Growing Though Most Orders Are for Single Machines

ORDERS from railroads in the Middle West continue to feature the machine tool and shop equipment market. During the week the Missouri, Kansas & Texas and the Rock Island railroads closed on large amounts of equipment. Other roads to make purchases within the past few days include the New York Central while the Baldwin Locomotive Works also placed a large order. Pending business from the railroads continues to encourage tool manufacturers and two large new lists are expected to be placed in the market shortly by the Pennsylvania and Burlington. General industrial orders have been fair but few were of such size as to be outstanding.

An inquiry for 40 machines recently issued by the General Electric Co., Schenectady, N. Y., is the largest to become current within the past few days. Other inquiries are small but are so numerous that the outlook for a good demand the rest of the month is encouraging. Industrial activity is expanding with a resulting increasing demand for equipment. The automobile industry continues to furnish an undiminished demand and large prospective buyers in the automobile industry include the Ford Motor Co. of Canada, Ltd., and the General Motors Corp. Other prospective purchasers of size are the D. J. Murray Mfg. Co., the Allis-Chalmers Co., the Air Pump Co., and the Seaman Body Corp.

Railroads Still Placing Large Equipment Orders

NEW YORK, Oct. 10.—A list of 40 small machine tools for the General Electric Co., Schenectady, N. Y., is the outstanding inquiry in the local machine tool market. Other inquiries are small, although numerous, and some sellers regard the outlook as fair.

While buying by eastern railroads continues small, eastern manufacturers have been in receipt within the past few days of some substantial business from Widdle Western railroads. The Missouri, Kansas & Texas closed on approximately $200,000 of equipment, including about $60,000 of cranes, and the Rock Island has bought approximately $80,000 of equipment. The New York Central closed on a rod milling machine and a bushing press. The Virginian railroad, Norfolk, Va., is inquiring for an axle lathe and is expected to close any time. Much attention continues to be centered on the Pennsylvania railroad. So far as can be learned, no machine tool list has as yet been issued, but with extensive plant improvements now getting under way this development is expected daily.

A large buyer in this district of late has been the Baldwin Locomotive Works, Philadelphia, this company closing on approximately 40 machine tools. Fairbanks, Morse Co., also has been a buyer, closing on three or four machines for one of its western plants. The purchases included two planers. The Crucible Steel Co., this city, closed on a 90-inch driving wheel lathe and a 96-inch wheel press.

At a meeting of machine tool builders recently in Lenox,

Crane Awards and Inquiries of the Week

Orders Placed

One 25-ton bucket crane, 60-foot boom, for Lake Superior & Ishpeming railroad, to the Industrial Works, Bay City, Mich.

One 20-ton bucket handling and magnet crane, 50-foot boom, for Briggs & Turivas, Chicago, to Industrial Works, Bay City, Mich.

One 25-ton bucket-handling crane, 50-foot boom, for W. A. Bechtel, California, to Industrial Works, Bay City, Mich.

Several overhead cranes for the Missouri, Kansas & Texas railroad; builder not announced.

One 18-ton locomotive crane, 50-foot boom, for St. Charles, Mo., plant of American Car & Foundry Co., to Orton & Steinbrenner, Chicago.

One 15-ton locomotive crane for Wilmington plant of Consolidated Machine Tool Corp. of America, New York, to Orton & Steinbrenner, Chicago.

Three 5-ton electric cranes for Wilmington plant of Consolidated Machine Tool Corp. of America, New York, to Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

One 5-ton, 1-motor crane, approximately 3-foot span, for bureau of yards and docks, at Key West, Fla., to Euclid Crane & Hoist Co., Euclid, O.

One 5-ton crane with 20-foot span, also runway 330 feet long, for W. Ames & Co., Jersey City, to New Jersey Foundry & Machine Co., 90 West street, New York.

One 1-ton conveyor system, 300 feet long, for the Ludwig Baumann Furniture Co., Eighth street, New York, to New Jersey Foundry & Machine Co., 90 West street, New York.

A 2-ton locomotive crane for Philmany Pulp & Paper Co., Appleton, Wis., to Browning Co., Cleveland.

Two 2-ton hoists for Long Island railroad, to Detroit Hoist & Machine Co.

One 6-ton electric crane, 61-foot span, for Barnet Weinstein, Brooklyn, to Pawling & Harnischfeger, Milwaukee.

One 5-ton crane, 53-foot span, for Cambridge Cement Stone Co., Boston, to Northern Engineering Works, Detroit.

One 150-ton electric traveling crane for Atchison, Topeka & Santa Fe, to Morgan Engineering Co., Alliance, O.

One 10-ton trolley for the Centre Foundry & Machine Co., Wheeling, W. Va., to the Northern Engineering Works, Detroit.

One 5-ton crane for the Pittsburgh Valve, Foundry & Construction Co., understood to have been awarded the Champion Engineering Co., Canton, O.

One 15-ton traveling crane for the city of Los Angeles to the Cyclops Iron Works, San Francisco.

One 20-ton traveling crane for the city of Los Angeles to the Cyclops Iron Works, San Francisco.

One 7½-ton traveling overhead lumber handling crane for the port of Grays Harbor, Aberdeen, Washington, to Pawling & Harnischfeger.

Orders Pending

One 3-ton electric crane for Asano Busaan Co., 165 Broadway, New York, for shipment to Japan.

One 15-ton electric crane for American Smelting & Refining Co., 120 Broadway, New York, early action expected.

One overhead crane for Central Railroad of New Jersey.

Two 12½-ton electric cranes, 87-foot span and two 3-ton, 2-motor cranes for Pennsylvania railroad, Philadelphia.

One 150-ton wrecker for Pennsylvania railroad, Philadelphia.

Forty-one cranes for new tube mill of the National Tube Co., Gary, Ind., engineering data being compiled, action expected within the month.

Cranes for the new strip and pipe mills of the Brier Hill Steel Co., Youngstown, O.; bids to be asked shortly.

Three to five cranes for the Jones & Laughlin Steel Co.'s various plants; action to be taken this week.

One 10-ton crane for the Pittsburgh Knife & Forge Co., Coreopolis, Pa.; bids being taken.

One 2-ton crane for the H. J. Heinz Co., Pittsburgh; action to be taken early this week.

Two 3 to 5-ton traveling cranes for the port of Tacoma, bids opened Oct. 5.

Eight 3-ton semi-portal cranes for the Valentine Pier at Vancouver, B. C. Bids opened Oct. 1.

One monorail system for the Southern Pacific. Bids received.

Mass., it appeared to be the general belief that prices on machine tools will continue upward. Advances are expectted in several lines, including drill presses, shapers, and milling machines; in fact, in some cases within the past few days increases already have been announced.

Buying of conveying equipment is on a broader scale, and in locomotive cranes much of the trading is in used equipment.

Machine tools, grinders, hydraulic presses, oil furnaces, high-speed drills and reamers, and ship and plant equipment will be auctioned at Hog Island, Pa., Nov. 1, 2 and 3 by the Emergency Fleet corporation. Much surplus material resulting from cancellation of the 13,000-ton passenger and cargo vessels being built by the Bethlehem Shipbuilding Corp. will be auctioned at Sparrows Point, Md., Nov. 22.

Industrial Development Furnishes Demand

MILWAUKEE, Oct. 10.—An unusual degree of industrial activity is developing in the Wisconsin territory which is proving to be of benefit to manufacturers and dealers in metalworking equipment. One of the largest projects is that of General Motors Corp. at Janesville, Wis., where a factory and a body plant are being established in the Samson tractor works, and new shop buildings aggregating 200,000 square feet are now under construction. At Wausau, the D. J. Murray Mfg. Co. is adding sawmill machinery, a 10-ton crane, large planers, boring mills and other machinery. In Milwaukee the Allis-Chalmers interests are building a sawmill and flour mill machinery shop which will make the tractor plant availabe entirely for the manufacture of tractors. The Milwaukee Air Power Pump Co. is erecting an entirely new plant needing much new machinery. The Seaman Body Corp. is doubling the size of its closed car body works at a cost of $400,000. Many items of lesser importance are before the trade as well. Steam and hydroelectric generating equipment is in good demand from municipal and private utilities. The Milwaukee Electric Railway & Light Co., the Wisconsin Public Service Co. and other large utilities are making large purchases.

Equipment Demand Continues Fair

CLEVELAND, Oct. 10.—Metalworking tool demand continues on a level with that of a week ago. While outstanding business is lacking individual orders have been numerous and total a large volume of business. One dealer interest reports that during the week it disposed of 23 tools purchased from the plant of the Chief Motors Co., Port Huron, Mich. Of these machines 17 went to one buyer and the remainder were distributed in single tool purchases. The automobile and allied industries continue to furnish the bulk of demand although some railroad business is developing. It is understood here that the Missouri, Kansas & Texas railroad made some purchases during the week but apparently none of this business was placed in this district. It is thought likely that most of it went to Cincinnati manufacturers. A list is expected to come out shortly from the Pennsylvania railroad which is making a number of improvements at its various car and repair shops.

Inquiries from the trade in general are numerous but aside from a few are limited to single tools. The Dayton Power & Light Co., Dayton, O., is understood to be in the market for general machine shop equipment and L. M. Walton, 3827 Eighth street, Richmond, Va., wants a lathe, drill press and burning machine. There are a number of inquiries in the market for special machinery such as equipment for stone crushing, woodworking, etc.

Considerable attention is being given to auctions of machinery being held in various parts of the country. The two auctions held by the government last week at Erie, Pa., and Toledo, O., were exceptionally well attended and some good prices were developed. It is understood that practically all the equipment at these auctions was moved, most of it in large blocks. Several days ago about 50 machines at the plant of the Van Blerck Motor Co., Monroe, Mich., were auctioned and practically all were moved. Dealers from all parts of the country attended this sale. A number of 2-spindle drill presses went at $100 apiece; gear hobbers of a favorite make brought $550 apiece; slab millers $1500 apiece and turret lathes $300. Some of the buyers at this auction included the Eastern Machinery Co., Cincinnati, and the Miles Machinery Co., Saginaw, Mich.

Tool Orders Are Small

SAN FRANCISCO, Oct. 6.—Although activity among the industries on the Pacific Coast is encouraging, machine tool sales have not been heavy. Dealers report small tools are moving at a much better rate than larger ones. Most sales have comprised single tool requirements only and inquiries for large lists are absent. Prices are advancing and many consumers are watching the upward tendency with some anxiety. Used equipment still is in good demand and stocks are becoming depleted.

Included among the sales during the past few weeks were three lathes, sold by Smith-Usher Co. Eccles & Smith Co. report the sale of eight lathes, four drill presses, one planer, four grinders, and two arbor presses.

Herberts Machinery & Supply Co. reports the sale of a motor-driven lathe to the Union Oil Co. a high speed drill to the Holmes Bed Mfg. Co. three lathes to the South Pasadena schools, a quick change lathe to the Guarantee Garage, a gap lathe to Russell Greene, Foell Co., Los Angeles, and a lathe to the Excelsior Machine Works, Los Angeles.

Crane inquiry and buying has been limited, although a number of power projects are planned which will involve the installation of a number of cranes.

Current Demand Is Small

PITTSBURGH, Oct. 10.—Expectancy marks the equipment market since with few sales reported most attention is expended upon several pending projects which give promise of early closing. On the 41 cranes for Gary, Ind., further data is being compiled such as wheel loads, bearing pressures, etc., and the understanding is that the actual choice is being narrowed down to two or three crane builders. Crane awards this week are limited to one or two single installations as are new inquiries.

Machine tool business largely is confined to single items, although the Pittsburgh board of education has distributed oders among various sellers on its recent list of about 20 items. The Dravo Contracting Co. has been a recent purchaser of one or two machines and several other local companies, including a nut and bolt manufacturer, have closed on miscellaneous equipment. One nearby manufacturer bought a representative lot of machine shop equipment, including a 16-inch lathe, a drill press, a floor grinder, a motor-driven hack saw, etc. A foundry in the Greensburg, Pa. district closed on some equipment including a cupola, elevator, etc., and has not completed purchases. Tools inquired for include a 42-inch and a 60-inch planer, a 4-foot radial drill, and other items. The Union railroad's inquiry for a large wheel press still is pending. Many users cannot obtain proper deliveries of raw material and hence, are uninterested in additional equipment. Some are paying for this waiting policy in that prices are being advanced, practically all representative lines having gone up 10 to 15 per cent in recent weeks. At the present time motor-driven machinery seems to be

favored by buyers. The Fowler Radiator & Mfg. Co., New Castle, Pa., is expected shortly to enter the market for equipment.

Sheetworking Tools Are in Demand

BOSTON, Oct. 10.—While inquiry continues to improve sales are slow to follow and negotiations of the past week have shown little change compared with immediate preceding weeks. Other than five tools to a Rhode Island manufacturer, sales have been mostly for individual machines. A 60-inch planer is one of the largest pieces of equipment placed. Other sales include a horizontal drill, a 26-inch vertical drill, and the usual number of lathes and lighter tools. Exceptionally heavy inquiry is reported for sheet metalworking tools, and several sales of punches and shears have already been made. Machine tool users evidently still are waiting for a definite price development in the market. The sentiment at the convention of machine tool builders at Lenox, Mass., during the week was strongly toward price advancing. New England machine tool builders nearly all report improved conditions with the month of September showing a better total of sales than in some time.

Prospective Demand Is Large

TORONTO, Ont., Oct. 10.—Improvement continues in the machine tool market. While actual sales are not large prospective business is good. Inquiries have appeared from a wide range of buyers. Inquiries for replacement purposes are numerous and there is a large number of users who are asking for equipment for new plants and additions.

W. W. Pearse, business administrator, the board of education, Toronto, Ont., is asking for boilers and a hydraulic hoist for Bowmore road school; also for boilers for Jarvis Collegiate. Plans are being prepared for a machine shop at Ford, Ont., for the Ford Motor Co. of Canada, for which equipment costing $150,000 will be required. The equipment will include lathes, planers, shapers, milling machines and general tools. The Detroit Steam Motors Corp. will erect a factory at Windsor, Ont., for which equipment will be purchased. The Maloney Electric Co., McDougall avenue, Windsor, Ont., shortly will enter the market for equipment. The Thompson Powder Co., Deseronto, Ont., is interested in equipment for a mixing house. W. J. Dalgleish, 221 Dundas street, Galt, Ont., is in the market for a molding machine squeezer. The Consolidated Homestake Mining & Development Co., 850 Hastings street, Vancouver, B. C., will build an ore stamp mill at Alice Arm, B. C., to cost $25,000. H. A. Johnson will build a foundry and machine shop at Truro, N. S., for which equipment will be purchased.

Steady Increase in Demand

CHICAGO, Oct. 10.—Demand for machine tool equipment is increasing steadily. The movement toward buying appears to be general in practically all branches of industry. Indications are that machinery buying during the fall will be much heavier than it has been for several months, especially if railroad buying keeps up. With the exception of the Burlington road, practically all lists formerly current have been closed, although a few scattering small tools remain to be placed. The Burlington is advancing its list and seems on the verge of placing it with dealers. It has passed the mechanical department and most of it is now in the hands of the purchasing agent, and it is believed the machines will be placed within the next few days. General buying continues to be principally of special tools of medium weight and standard equipment is not in much demand. While prices continue to tend upward, no new advances have been announced within the past few days.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

BRIDGEPORT, CONN.—The Lacey Mfg. Co., builder of machinery, has let the contract for a 1-story factory building to cost $25,000.

BRISTOL, CONN.—The Clayton Mfg. Co., maker of shears, has increased its capital stock from $100,00 to $150,000.

ATLANTA, GA.—The Southern Wire & Iron Works has acquired a site at Dallas, Tex., on which it plans a shop at an estimated cost of $60,000.

CHICAGO—The Kroeschell Bros. Co., 460 West Erie street, plans a 1-story plant building, 210 x 375 feet, to cost about $300,000.

CHICAGO—The Joyce-Watkins Co., 332 South Michigan avenue, plans to establish a barge building plant at Paducah, Ky.

CHICAGO—The Advance Pattern & Foundry Co., 2734 West 36th place, plans a warehouse, 35 x 146 feet.

CHICAGO—S. G. Robins, 140 North Dearborn street, has let the contract for a 1-story machine shop to cost about $35,000.

CHICAGO—The American Building Foundry Co., 2300 South Springfield avenue, has let the contract for a 1-story plant addition, 35 x 93 feet, to cost about $7000.

CHICAGO—The Gits Bros. Mfg. Co., manufacturer of auto parts, 1941 South Kilbourn avenue, has let a contract for a 1-story plant addition, 25 x 56 feet and 14 x 150 feet, to cost $25,000.

CHICAGO—The Troy Trailer & Wagon Co., 606, 29 South La Salle street, has been incorporated with $350,000 capital stock by E. M. Blamkenheim, Walker Butler and Joseph F. Cervinka. The company is represented by D. M. Healy, 1119 Conway building.

CHICAGO—The Hassinger Gravimeter Corp., 616, 82 West Washington street, has been incorporated with $175,000 capital stock by George Jay Kopp, Adolph T. Hassinger, and J. E. Meyer. The company is represented by Brnckner & Ingraham, 616, 82 West Washington street.

CHICAGO—The Mid-City Foundry Corp., 1901 South Rockwell street, has been incorporated with $15,000 capital stock by Julius Drofka, Carl J. Berg, Frank Cederwall and L. Dahlberg. The company is represented by J. Henry Debus, 19 South La Salle street.

CHICAGO—The Albany Steel & Brass Corp., 716 West Madison street, has been incorporated with 100 shares of no par value by J. Kendall, G. Mitchell and Herbert Green. The company is represented by J. K. S. Mitchell, 1208 American Bond & Mortgage building.

CHICAGO—The Summit Electric Co., 1610 South Michigan avenue, has been incorporated with $10,000 capital stock by L. D. Jensen, R. Lisewski, S. A. Carlston and B. N. Pechone. The company is represented by Carlson & Herre, 231, 154 West Randolph street.

DIXON, ILL.—The Reynolds Wire Co. plant

a 4-story factory building, 150 x 150 feet, to cost about $150,000.

EAST ALTON, ILL.—The Western Cartridge Co. plans a 1-story brass mill addition, 86 x 240 feet, to cost $50,000.

NORTH CHICAGO, ILL.—The Modern Automotive Mfg. Co., 2004 Sheridan road, has been incorporated with $15,000 capital stock by Alford E. Budde, Rosella B. Ivandick, and others. The company is represented by M. J. Ivandick, 45 Broadway.

SOUTH BARTONVILLE, ILL.—The Keystone Wire & Steel Co. plans a 1-story building, 220 x 280 feet, to cost about $55,000.

VIENNA, ILL.—Elam & Upton, Inc., has been incorporated with $15,000 capital stock to manufacture electric current, by W. B. Elam, Colmore Upton, Earl R. Upton, and others.

ALEXANDRIA, IND.—The Ziegler Mfg. Co., manufacturer of metal stampings, and screw machine products, plans a 1-story plant addition, 60 x 200 feet.

INDIANAPOLIS—The Rockwood Mfg. Co., 1801 English avenue, plans two 1-story machine shop buildings, 100 x 200 feet and 75 x 100 feet, to cost $40,000.

BOWLING GREEN, KY.—The Metallic Casket Co. has been incorporated with $25,000 capital stock by J. E. Tyler, John and E. H. Davis.

LOUISVILLE, KY.—The Burdorf Co., electrical supplies, has been incorporated with $100,000 capital stock by Fred G. and I. C. Burdorf and Edward G. Klemm.

PIKEVILLE, KY.—The Pike & Power Co. has increased its capital stock to $200,000 and plans improvements to its plant.

BOSTON—The John Binney & Son Co. has been incorporated as a metal worker with a capital stock of $25,000 by Herbert O. Morton, Samuel H. Whittemore and James F. Rollins.

BOSTON—The Beacon Auto Spring Mfg. Co. has been organized by A. Finnelstein, Louis Mirsky and Jacob Kepnes, 11, 5 Cambridge street, Allston district.

BOSTON—The Ball Clip Mfg. Co. has been incorporated to build automatic wire machinery with $35,000 capital by Edward S. Foster, Frank W. Gibson and W. Herbert Averill.

BOSTON—The National Auto Spring Lubricator Co. has been incorporated with $100,000 capital by William F. Rhoda, West Medford, Mass., H. G. O'Connor and Charles H. Brown, Winthrop, Mass.

EVERETT, MASS.—The Sexton Can Co., 31 Cross street, has awarded a contract for a 1-story plant addition.

HOLYOKE, MASS.—The E. H. Friedrich & Co., Inc., sheet metal worker, has plans for a factory addition, 70 x 150 feet.

LAWENCE, MASS.—Bids have closed for a 1-story, 62 x 112-foot machine shop for the Champion-International Co.

NEW BEDFORD, MASS.—The New Bedford Tensioning Devices, Inc., has been organized with a capital of $25,000. John G. Nicholson is president.

ROXBURY, MASS.—The Albert Griffiths Co., 30 Whittier street, plans a 1-story plant addition, 40 x 90 feet, to cost $20,000.

WINCHENDON, Mass.—William K. Brown & Son, 420 Central street, plans a 1-story power house, 30 x 50 feet.

DETROIT—The Maxwell Motor Corp. plans a factory building addition.

DETROIT—The Aman Foundry Co. has been incorporated with $10,000 capital stock by John Aman, and others.

DETROIT—The American Twist Drill & Tool Co., 2804 West Jefferson avenue, recently was damaged by fire.

DETROIT—The Acme Saw Co., 522 Fort street west, has been incorporated to manufacture bandsaws, by H. E. Culverwell, Donald J. Bryant and Francis H. McCarthy.

DETROIT—The Federal Pattern Co., 8741 Kercheval avenue, has been incorporated with $5000 capital stock by B. M. Uhlig, E. F. Wunsch and J. Louis Horn.

MONROE, MICH.—The Monroe Auto Equipment Co. plans a 1-story foundry addition, 40 x 60 feet.

SAGINAW, MICH.—The Baker-Perkins Mfg. Co. plans a 1-story power works addition.

SAGINAW, MICH.—The Saginaw Chemical Co. plans two factory buildings, 1-story 60 x 180 feet, and 1-story 30 x 40 feet, to cost $50,000.

NEWARK, N. J.—H. M. Nelson, 248-68 Thomas street, manufacturer of machinery, plans a 1-story machine shop, 79 x 100 feet.

NEWARK, N. J.—Work will be started shortly on a 2-story, 70 x 150-foot addition to the garage of the department of streets and public utilities.

NEWARK, N. J.—The Knickerbocker Steel Ceiling Co. has been incorporated with $10,000 capital stock by James J. Coen, Irene Katzen

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.25c
Buffalo	3.10c
Chicago	2.80c
Cincinnati	2.95c to 3.10c
Cleveland	2.91c
Detroit	2.90c
New York	3.04c
Philadelphia	3.025c
San Francisco	3.40c
Seattle	3.60c
St. Louis	2.90c
St. Paul	3.05c
Los Angeles	3.50c

IRON BARS

Boston	3.25c
Buffalo	3.10c
Chicago	2.80c
Cincinnati	3.10c
Detroit	2.90c
New York	2.94c
Philadelphia	3.025c
St. Louis	2.90c

SHAPES, STRUCTURAL

Boston	3.165c
Buffalo	3.20c
Chicago	2.90c
Cincinnati	3.05c to 3.20c
Cleveland	3.01c
Detroit	3.00c
New York	3.14c
Philadelphia	3.125c
San Francisco	3.40c
Seattle	3.60c
St. Louis	3.00c
St. Paul	3.15c
Los Angeles	3.60c

PLATES

Boston	3.35c
Boston 3/16-inch	3.04c
Buffalo	3.20c
Chicago	2.90c
Cincinnati	2.95c to 3.20c
Cleveland	3.01c
Detroit	3.00c
New York	3.14c
Philadelphia	3.125c
San Francisco	3.50c
Seattle	3.60c
St. Louis	3.00c
St. Paul	3.15c
Los Angeles	3.65c

NO. 10 BLUE ANNEALED SHEETS

Boston, 1/4-inch	4.15c
Buffalo	4.05c
Chicago	4.00c
Cincinnati	3.75c to 4.00c
Cleveland	3.70c to 3.76c
Detroit	3.95c
New York	4.19c
Philadelphia	3.85c
San Francisco	4.50c
Seattle	4.85c
St. Louis	4.10c
St. Paul	4.25c
Los Angeles	4.70c

NO. 28 BLACK SHEETS

Boston	5.40c
Buffalo	4.85c
Chicago	4.85c
Cincinnati	4.00c
Cleveland	4.40c
Detroit	4.90c
New York	4.90c
Philadelphia	4.60c
San Francisco	6.05c
Seattle	5.85c
St. Louis	4.95c
St. Paul	5.10c
Los Angeles	6.10c

NO. 28 GALVANIZED SHEETS

Boston	6.40c
Buffalo	5.85c
Chicago	5.85c
Cincinnati	5.20c
Cleveland	5.40c
Detroit	5.90c
New York	5.90c
Philadelphia	5.75c
San Francisco	6.90c
Seattle	6.85c
St. Louis	5.95c
Los Angeles	6.90c

BANDS

Boston	4.25c
Buffalo	3.90c
Chicago	3.55c
Cincinnati	3.70c to 3.85c
Cleveland	3.61c
Detroit	3.70c
New York	3.84c
Philadelphia	3.825c
San Francisco	4.05c
Seattle	4.35c
Los Angeles	4.40c

HOOPS

Boston	4.75c
Buffalo	4.10c
Cleveland	3.61c
Detroit	3.95c
New York	4.39c
Philadelphia	4.25c
Seattle	5.00c

COLD ROLLED SHAFTING

Boston (rounds)	4.00c
Buffalo	3.95c
Chicago (rounds)	3.80c
Cincinnati (rounds)	3.75c
Detroit (rounds)	3.80c
New York	3.90c
New York (flats, squares and hexagons)	4.40c
Philadelphia (rounds)	3.85c
San Francisco	5.00c
Seattle	5.25c
Los Angeles	5.10c
Boston (flats, squares and hexagons)	4.50c

MORE RELIABLE THAN CASTINGS

Pressed Steel Body Sill formerly a Casting

Parish & Bingham Pressed Steel Parts are much more reliable than castings, because:

They are stronger than castings.

They are tougher than castings.

They are less brittle than castings.

They are more uniform than castings in both shape and weight.

Furthermore, Parish & Bingham Pressed Steel Parts are lighter in weight than castings, and much lower in cost.

Also, when you get them they are completely finished—there is absolutely no machining to do.

Have you some part with which we may assist you right now? Or when you get ready to design a new part let us know—we can show you how to get better and quicker results and save money.

Parish & Bingham Engineers are specialists in designing suitable pressed steel substitutions for castings, and we shall be glad to place them at your service.

Just tell us you are interested

A Few of the Hundreds of Parts We can make for You—

Brake Drums; Axle Housings; Running Boards; Engine Pans; Hub Flanges; Axle Housing Covers; Torque Arms; Battery Supports; Lathe Pans; Tire Carriers; Running Board and Step Hangers; Pressed Steel Commercial Car Wheels; Light Railroad Stampings; Agricultural Implement Parts, etc.

Parish & Bingham Corporation

Builders of Automobile Frames and Steel Stampings

CLEVELAND, OHIO

P&B

PARISH & BINGHAM Pressed Steel Parts

and Max Katzen.

TRENTON, N. J.—The Standard Inlaid Mfg. Co. plans a 2-story factory addition, 35 x 258 feet.

TRENTON, N. J.—The Panelyte Board Co., Smith building, has acquired a site on which it plans a plant for the manufacture of fiber products. The company recently was organized with $300,000 capital stock by D. Mason Sutherland Jr., and others.

BATAVIA, N. Y.—P. W. Miner & Son plan a factory addition, three stories, 45 x 140 feet, to cost about $50,000.

BROOKLYN, N. Y.—The Sunnyside Foundry, recently organized, plans to establish a plant in Long Island City in a 1-story building, 25 x 60 feet.

BROOKLYN, N. Y.—An 80 x 130-foot plant, two stories, will be erected at Classon avenue and Clifton place, by the United Last Co. The general contract has been awarded the Turner Construction Co.

BFFALO—The Buffalo Bronze Die-Casting Co., 90 Arthur street, plans a plant addition.

BUFFALO—The Keystone Tool & Metal Parts Corp., 65 Oak street, plans a 1-story works addition, 34 x 75 feet.

BUFFALO—The Automotive Power Gear Co. of Buffalo has been incorporated with $25,000 capital stock by C. R. Berney and D. Pasternack. The company is represented by F. E. Freedman.

NEW YORK—The Consolidated Machine Tool Corp., 17 East Forty-second street, plans extensions and improvements to its plants.

NEW YORK—The Baird Steel Corp. has been incorporated with $10,000 capital stock by M. E. Baird, W. A. McDermott and others. The company is represented by W. J. Oliver, 220 Broadway.

NEW YORK—The Harvey Mfg. Corp., metal goods, has been incorporated with $20,000 capital stock by F. Roberts, A. Schichowsky and C. E. Sutherland. The company is represented by M. Friedberg, 116 Nassau street.

NEW YORK—Approximately $3,000,000 will be expended by the Corn Products Refining Co. on extensions at its refineries at Edgewater, N. J., Pekin and Argo, Ill. This sum includes the purchase of necessary equipment.

NEW YORK—Stockholders of the American Machine & Foundry Co., 511 Fifth avenue, will meet Oct. 17, to consider action on increasing the company's capital stock from $2,00,000 to $10,000,000. It is understood that a portion of the proposed increase is for improvements.

NORTH TONAWANDA, N. Y.—The plant of the Auto Wheel Coaster Co. recently was damaged by fire. It will be rebuilt.

SYRACUSE, N. Y.—The United States Hoffman Machinery Co., 329 Temple street, plans a works addition.

UTICA, N. Y.—The Utica Motor Car Co., Genesee street, has awarded a contract for an addition, 48 x 250 feet, to cost about $100,000.

WATERTOWN, N. Y.—The Eager Electric Co. plans a brass foundry to cost $15,000.

CHARLOTTE, N. C.—The Southern Oil Burner Co. has been incorporated with $100,000 capital stock by Charles F. Shuman, Charles P. Heindel and others to manufacture automatic oil burners, etc.

HIGH POINT, N. C.—The plant of the P. A. Thomas Car Works, Inc., recently was damaged by fire.

WILMINGTON, N. C.—The Atlantic Coast Line railroad plans an engine and repair shop here.

ASHTABULA, O.—The Saybrook Light, Power & Water Co. has been incorporated with $10,000 capital stock by J. P. Dodge, L. Heath, E. D. Richards, Max E. Fros and C. R. Busse.

CINCINNATI—The Cino Radio Mfg. Co. has been incorporated with $500 capital stock by H. R. Fordyce, Thomas N. Fordyce, Russell M. Blair, Lester Blair and Louis Homan Jr.

CLEVELAND—The Mechanical Rubber Co. has a permit to erect a factory addition to cost $20,000.

COLUMBUS, O.—The Standard Bolt Corp. plans to rebuild a 1-story factory building, 60 x 100 feet.

DAYTON, O.—The Advance Foundry Co.

Tool Exports Show Gain

FIGURES just issued by the United States department of commerce bureau of foreign and domestic commerce show that in August 2456 individual metalworking tools were exported. This compares with 2306 in July, a gain of 150; 2464 in June, a loss of eight and 2049 in May, a gain of 407. Individual comparisons for the four months are as follows:

	August	July	June	May
Lathes	85	76	64	81
Boring and drilling machines	94	65	273	115
Planers, shapers and slotters	25	26	45	14
Bending and power presses	19	18	32	24
Gear cutters	10	37	15	8
Milling machines	36	25	39	21
Sawing machines	13	12	24	16
Thread cutting and screw machines	118	24	33	30
Punching and shearing machines	17	31	62	12
Power hammers	15	12	38	59
Rolling machines	1	20	1	5
Wire drawing machines	9	2	139	128
Polishing and burnishing machines	4	1	4	2
Sharpening and grinding machines	1375	1062	1270	1226
Pneumatic portable tools	635	895	425	308
Total	2456	2306	2464	2049

Business Changes Recently Announced

HICKMAN, Williams & Co., Inc., have moved their Philadelphia office from 901 Morris building to 1840-42-44 Widener building.

* * *

The name of the Ironton Solvay Coke Co., Gaylord building, Ashland, Ky., has been changed to Ironton By-Product Coke Co.

* * *

Effective Oct. 1 the Kentucky Solvay Coke Co. changed its name to the Ashland By-Product Coke Co. General offices are in the Gaylord building, Ashland, Ky.

* * *

The General Steel Corp., Detroit, has moved into larger quarters, at 1320 Dime Bank building, that city. Its warehouse is at 5674 Twelfth street.

* * *

Philadelphia offices of the International Fuel & Iron Corp. have been moved from the Stock Exchange building to 215 South Broad street.

* * *

J. N. Moyer, Philadelphia, dealer in power presses, machine shop equipment and supplies, has moved his offices from 1420 Chestnut street to 119 North Third street, where he has established a new showroom. His warehouse and machine shop, formerly in Second street, is now at 309 Race street.

* * *

The Apollo Steel Co., Apollo, Pa., has opened district sales offices at 920 McKnight building, Minneapolis, and in the McKevitt building, Norfolk, Va., for the sale of all grades of steel sheets.

* * *

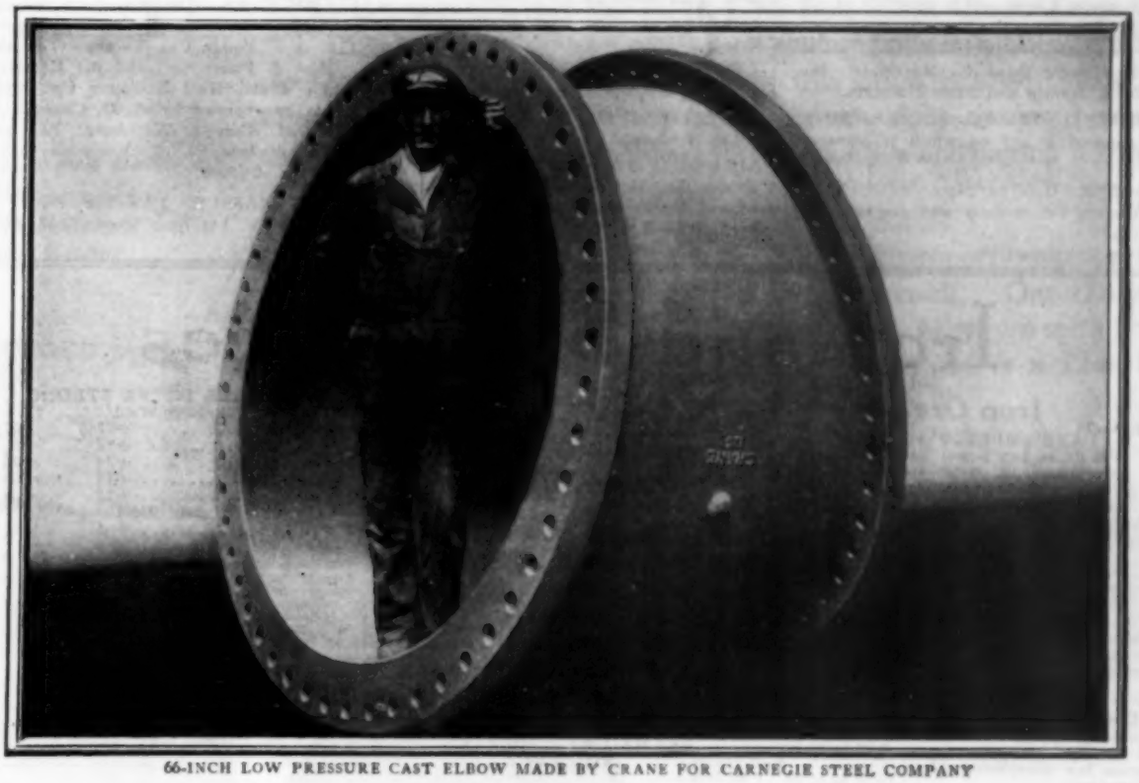
Canadian business will be handled by the Buffalo offices of both the Bethlehem Steel Corp., and the Republic Iron & Steel Co. Canadian prices have been on a lower alignment than American prices for some time.

* * *

Western New York and Ontario territory are to be covered by a new branch office established by the Cutler-Hammer Mfg.. Co, Milwaukee, at 538 Ellicott square, Buffalo, with B. A. Hansen in charge.

* * *

District sales offices have been opened at 53 West Jackson boulevard, Chicago, by the Ohio Electric & Controller Co., Cleveland, with Mark C. Smith as district sales manager.



66-INCH LOW PRESSURE CAST ELBOW MADE BY CRANE FOR CARNEGIE STEEL COMPANY

CRANE COMPREHENSIVE SERVICE

In the execution of any engineering project a reliable source of supply is an important factor of economy. Crane valves and fittings supplied for individual requirements are carefully designed and constructed to insure dependable service at a minimum cost for upkeep.

Crane Co. manufactures special valves and fittings to meet the most exacting requirements of any pipe line for any industrial purpose.

CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVE., CHICAGO

Branches and Sales Offices in One Hundred and Thirty-five Cities

National Exhibit Rooms: Chicago, New York, Atlantic City

Works: Chicago and Bridgeport

CRANE, LIMITED, MONTREAL. CRANE-BENNETT, LTD., LONDON
CRANE EXPORT CORPORATION: NEW YORK, SAN FRANCISCO
CIE CRANE, PARIS

plans a plant addition 100 x 500 feet.

EAST LIVERPOOL, O.—The Ohio & Pennsylvania Electric Co. has purchased a site here on which it plans a large power plant.

FINDLAY, O.—The Marvin Machine Co. has been incorporated with $5000 capital stock by Bert T. Marvin, Frank A. Marvin, A. M. Marvin, E. E. Marvin and Russell Marvin.

FREMONT, O.—The Fremont Metal Body Co. has acquired a site on which it plans a plant.

LANCASTER, O.—The plant of the Fairfield Engineering Co. recently was damaged by fire.

SPRINGFIELD, O.—The Ohio Kennedy Co. has been incorporated with $10,000 capital stock to manufacture blow torches. George Cugley is president of the company.

TOLEDO, O.—The Bock Bearing Co. plans a factory addition, one story.

UHRICHSVILLE, O.—Gallagher Bros. are erecting an addition to their machine shop.

ZANESVILLE, O.—The American Gas Electric Co. is reported planning a plant here.

ALTOONA, PA.—The Penn Central Light & Power Co., 1809 Union avenue, plans extensions and improvements to its plant.

BOYERTOWN, PA.—Work will be started shortly on a 1 and 2-story foundry, 100 x 150 feet, for the Eastern Foundry Co. A. S. Kepner, Pottstown, Pa., is architect.

ERIE, PA.—The Wattsburg Borough Light, Heat & Power Co., Greene Township Light, Heat & Power Co., Venango Township Light, Heat & Power Co., and the Greenfield Township Light, Heat & Power Co., each recently was incorporated by A. O. Chappin, Erie, Pa., W. H. Cornell, Wattsburg, Pa., and O. J. Graham, Erie, Pa. Each company has a capitalization of $5000.

PARNASSUS, PA.—The Auto Spring & Repair Co. has been incorporated with $10,000

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.95
Mesabi Bessemer, 55 per cent iron	5.70
Old Range nonbessemer, 51½ per cent iron	5.20
Mesabi nonbessemer, 51½ per cent iron	5.05

PORT HENRY IRON ORE
Per Gross Ton, F.o.b., Port Henry

Old bed 21 furnace	$5.00
Old bed concentrates, 63 per cent	5.25
Harmony, cobbed, 63 per cent	5.25
New bed, low phos., 65 per cent	7.50
Lump ore for fix	6.00

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports.

Spanish low phosphorus, 52 to 54 per cent	9.00 to 10.50
Algerian low phosphorus, 52 to 54 per cent	10.50 to 11.00
Swedish and Norwegian low phosphorus, 68 per cent	11.00 to 11.50
Swedish foundry or basic, 68 per cent	9.00 to 9.50
Spanish foundry or basic, 52 to 54 per cent	8.50 to 9.50

Manganese Ore

Brazilian, 48 to 50 per cent c.i.f. Atlantic ports, 29½ cents per unit.

Indian 48 to 50 per cent c.i.f. Atlantic ports, nominal.

Caucasian, 52 per cent, c.i.f. Atlantic ports, 29 cents per unit.

Fluor Spar

Washed gravel, Kentucky and Illinois mines, per ton $17.00 to 18.00

Rivets

Structural rivets, Pittsburgh	3.00c to 3.15c
Boiler rivets, Pittsburgh	3.10c to 3.25c
Rivets, ⅞-inch and smaller	65 off to 65-5 off

Nuts and Bolts

NUTS
(Up to 1¼ and 1½ inches inclusive)

Hot pressed square or hexagon blank or tapped	$3.25 to $3.50 off list
Cold punched square or hexagon blank or tapped	$3.25 to $3.50 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts ⅝-inch and smaller	70-10-5 off
Case hardened, finished, hexagon	65-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS
½ x 6 inches, smaller and shorter

Rolled thread	50-10-5 off
Cut thread	50 off
Larger and longer	50 off

MACHINE BOLTS
(½ x 4 inches, hot pressed nuts)

Rolled thread	60-5 off
Cut thread	50-10 off
Larger and longer	50-10 off

(½ x 4 inches, cold punched nuts)

Cut thread	45 off
Larger and longer	45 off
Lag screws	50-10 to 60-5 off
Plow bolts Nos. 1, 2 and 3 heads	50-5 off
Tap bolts	30 off
Bolt ends with hot pressed nuts	50-10 off
Bolt ends with cold punched nuts	45 off
Blank bolts	50-10 off
Rough stud bolts with nuts	45 off

Steel Pipe

Pittsburgh basing discounts, jobbers, carloads

	Black	Galvanized
Butt Weld		
⅛-inch	51½	26
¼ and ⅜-inch	57	31½
½-inch	62	48½
¾-inch	66	54½
1 to 3-inch	68	56½
Lap Weld		
2-inch	61	49½
2½ to 6-inch	65	53½
7 to 8-inch	62	49½
9 to 12-inch	61	48½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	66	54½
Lap Weld		
2-inch	59	47½
2½ to 6-inch	63	51½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	47½	31
¼ and ⅜-inch	53	36½
½-inch	59	48½
¾-inch	64	53½
1 to 1¼-inch	66	55½
2 to 3-inch	67	56½
Lap Weld		
2-inch	59	48½
2½ to 4-inch	63	52½
4½ to 6-inch	62	51½
7 to 8-inch	58	45½
9 to 12-inch	52	39½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	48	38½
¾ to 1¼-inch	51	41½
2 to 2½-inch	53	43½
Lap Weld		
2-inch	47	38½
2½ to 4-inch	49	40½
4½ to 6-inch	48	39½
7 to 8-inch	44	31½

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers, carloads

	Black	Galvanized
THREADS AND COUPLINGS		
Butt Weld		
¼ and ⅜-inch	+ 7	+33
½-inch	26	8
¾-inch	32	17
1 to 1¼-inch	34	19
Lap Weld		
1½ and 1½-inch	Upon application	
2-inch	29	15
2½ to 6-inch	32	19
7 to 12-inch	30	17
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+15	+48
½-inch	25	13
¾-inch	32	18
1 to 1¼-inch	34	20
Lap Weld		
2-inch	30	17
2½ to 4-inch	33	21
4½ to 6-inch	32	20
7 to 8-inch	25	13
9 to 12-inch	20	8

DOUBLE EXTRA STRONG

Butt Weld		
½-inch	+37½	+49½
¾-inch	+18	+30
1-inch	+34	+46
1¼-inch	+18	+30
1½-inch	+17	+29
Lap Weld		
2 and 2½-inch	+ 3	+15
3 to 4-inch	2	+ 7
4½ to 6-inch	1	+ 7
8-inch	+ 4	+ 8

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL	
1¼-inch	17½ to 19½
2 and 2¼-inch	32 to 34
2½ to 3-inch	43 to 45
3¼ to 4-inch	48 to 50
CHARCOAL IRON	
1½-inch	+11
1¾-inch	+ 1
2 and 2¼-inch	9
2½ to 3-inch	14
3¼ to 4½-inch	16
SEAMLESS COLD DRAWN	
1-inch	53
1¼ and 1½-inch	45
1¾-inch	29
2 and 2¼-inch	32
2½ and 2¾-inch	36
3-inch	40
3¼ to 4-inch	45
4½ and 5-inch	37
SEAMLESS HOT ROLLED	
3-inch	42
3¼ to 4-inch	47

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base discount on all carbon steels except 0.30 to 0.40 per cent and 0.40 to 0.50 per cent carbon; direct shipment from mills in large quantities 88 off

On 0.30 to 0.40 per cent and 0.40 to 0.50 per cent carbon 86 off

Plus usual differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot, f.o.b. Pittsburgh Price
2-inch	12-gage	12½c
2-inch	11-gage	13c
2-inch	10-gage	14½c
2¼-inch	12-gage	14c
2¼-inch	11-gage	14½c
2¼-inch	10-gage	16c
3-inch	7-gage	31½c
1½-inch	9-gage	41½c
5⅜-inch	9-gage	47c
5½-inch	9-gage	49c

Plus usual extras for forming and for long lengths.

FIVE YEARS SEVERE ROLLING MILL SERVICE

Flexible as a Belt
Positive as a Gear
More Efficient than Either

FIVE years ago this 350 H. P. Link-Belt Silent Chain Drive was installed to drive two eight-inch rolling mills in a Southwestern steel plant. Throughout these years this drive has withstood the severe fluctuations of rolling mill service—daily saving power—daily making the driven machine more productive and paying a greater dividend on its costs.

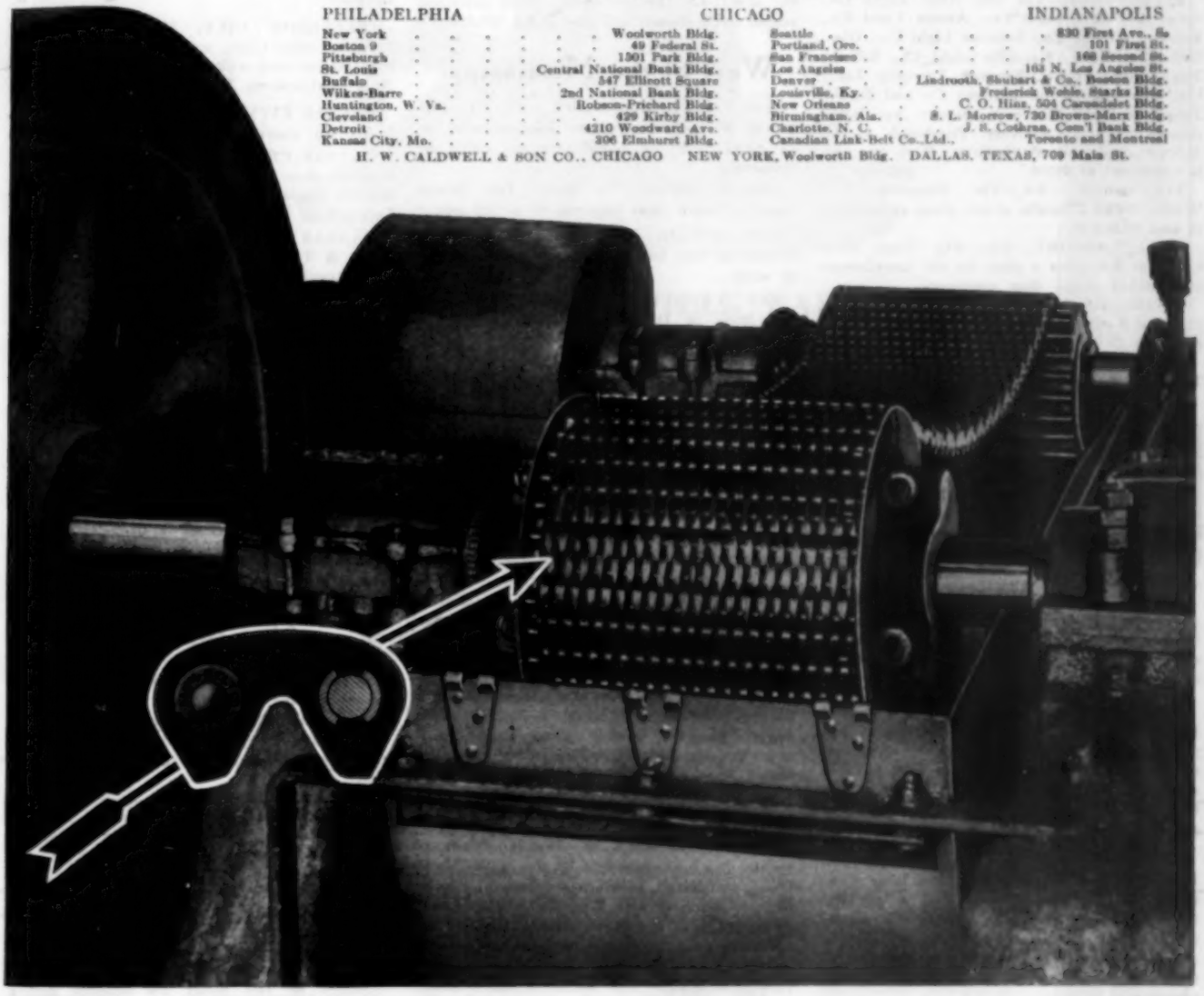
Let our engineers show you how you can reap proportionate savings in your plant whether your drives be large or small. Our 128 page price-list data book No. 125 will interest you. May we send you a copy? Address nearest office. Remember—there is a Link-Belt power transmission specialist for every industry.

973

LINK-BELT COMPANY

PHILADELPHIA		CHICAGO		INDIANAPOLIS	
New York	Woolworth Bldg.	Seattle	830 First Ave., So.		
Boston 9	49 Federal St.	Portland, Ore.	101 First St.		
Pittsburgh	1301 Park Bldg.	San Francisco	168 Second St.		
St. Louis	Central National Bank Bldg.	Los Angeles	163 N. Los Angeles St.		
Buffalo	547 Ellicott Square	Denver	Lindrooth, Shubart & Co., Boston Bldg.		
Wilkes-Barre	2nd National Bank Bldg.	Louisville, Ky.	Frederick Webb, Starks Bldg.		
Huntington, W. Va.	Robson-Prichard Bldg.	New Orleans	C. O. Hinz, 504 Carondelet Bldg.		
Cleveland	429 Kirby Bldg.	Birmingham, Ala.	S. L. Morrow, 730 Brown-Marx Bldg.		
Detroit	4210 Woodward Ave.	Charlotte, N. C.	J. S. Cothran, Com'l Bank Bldg.		
Kansas City, Mo.	306 Elmhurst Bldg.	Canadian Link-Belt Co., Ltd.,	Toronto and Montreal		

H. W. CALDWELL & SON CO., CHICAGO NEW YORK, Woolworth Bldg. DALLAS, TEXAS, 709 Main St.



LINK-BELT

capital stock by Dan Greco, 121 Baldrick street, W. E. Ward and Louis Claster.

MT. WOLF, PA.—The American Wire Fabrics Corp. plans extensions and improvements to its plant.

PHILADELPHIA—A $20,000 factory will be erected by the Murlin Mfg. Co.

PHILADELPHIA—Humphreys & Co. plan a 2-story plant building.

PHILADELPHIA—The Philadelphia Electric Co., Tenth and Chestnut streets, is erecting a 2-story power house, 60 x 120 feet.

PHILADELPHIA—A $5000 shop will be erected by the Wilmot Fleming Iron & Steel Co.

PHILADELPHIA—Work will be started shortly on a 1-story addition to the plant of the Air Reduction Sales Co.

PHILADELPHIA—The Traylor Engineering Co., Broad street and Lehigh avenue, has awarded a contract for a factory building, 124 x 205 feet.

PITTSBURGH—The Hanlon-Gregory Galvanizing Co. plans a plant building at an estimated cost of $65,000.

PITTSBURGH—The Ben Avon Light Co., Stowe Township Light Co., Avalon Light Co., Emsworth Light Co., Bellevue Light Co., Glenfield Electric Co., Haysbille Light Co., Kilbuck Township Light Co., Kennedy Township Light Co., Robinson Township Light Co. and Neville Township Light Co., each recently was incorporated by J. R. McNary, Pittsburgh, B. U. McClintock and E. P. Griffiths. Each company is capitalized at $5000.

TITUSVLLE, PA.—The Titusville Iron Works, South Franklin street, plans an addition to cost $125,000.

WILLIAMSPORT, PA.—The Ideal Dust Conveyor Co. plans a plant for the manufacture of patented metal dust conveyors.

YORK, PA.—The York Corrugating Co. plans a 1-story factory building, 184 x 249 feet.

PROVIDENCE, R. I.—A contract for a 1-story addition, 100 x 100 feet, has been awarded the Ci Bigney Construction Co., by the Colvin Foundry Co.

CHATTANOOGA, TENN.—The Du Bois Tube & Rubber Co. plans enlargements to its plant.

KNOXVILLE, TENN.—The Knoxville Power & Light Co. is reported planning improvements to its plant.

RUTLAND, VT.—The factory of the Manning Mfg. Co., builder of dairy machinery, was damaged by fire.

SYLVATUS, VA.—The Sylvatus Light & Power Co. has been incorporated with $10,000 capital stock by G. W. Lewis, I. L. Gray and others.

MILWAUKEE—The Milwaukee Air Pump Co., 886 Third street, plans a 1-story factory and office building, 130 x 150 feet.

OSHKOSH, WIS.—The plant of the Star Foundry recently was damaged by fire.

RHINELANDER, WIS.—A machine shop, 1-story, 40 x 100 feet, is being erected by the Wisconsin Regrinding Co.

WAUKESHA, WIS.—A power plant, 30 x 60 feet, will be erected by the Lux Fibre Furniture Co. at 821-825 Meadow street. With additional engine and boilers it will cost about $25,000.

West of the Mississippi

WALNUT RIDGE, ARK.—The Central Power & Light Co. plans improvements to its plant and the installation of additional equipment.

LOS ANGELES—The Martin Iron Works plans a 1-story plant building, 90 x 115 feet.

SAN DIEGO, CAL.—The National Iron Works has been incorporated with 100,000 shares of stock.

SAN FRANCISCO—The Hebern Electric Co., Bank of Italy building, has awarded a contract for a 3-story plant building, 100 x 200 feet, to cost about $150,000.

BOULDER, COLO.—The Western Light & Power Co. plans extensions and improvements to its plant.

DES MOINES, IOWA—The Keith Furnace Co. is completing a foundry at an estimated cost of $150,000.

MANSFIELD, LA.—The Mansfield Light & Power Co. has increased its capital stock to $50,000.

NEW ORLEANS—The Liberty Mfg. Co., metal signs, plans extensions to its plant and has purchased a plant site.

NEW ORLEANS—The Algiers Dry Dock & Ship Repair Co. is reported planning a floating drydock.

NEW PRAGUE, MINN.—The Copher Machine Mfg. Co. plans a 1-story machine shop, 60 x 100 feet.

ST. PAUL—The American Radiator Co., Buffalo, is reported considering the establishment of a plant here.

FRANKLIN, MO.—The Franklin Electric Co. has been incorporated with $20,000 capital stock by B. E. Perkinson, John Rogers and B. E. Boon.

JEFFERSON CITY, MO.—The Building Products Mfg. Corp., weather strips, etc., has been incorporated with $10,000 capital stock by H. F. Fahrenkrog, J. M. and A. M. Hartz.

KANSAS CITY, MO.—The Kansas Electric Power Co. plans extensions and improvements.

KANSAS CITY, MO.—The Hart Parr Co., machine shop, has been incorporated with $2,500,000 capital stock by C. W. Hart, C. H. Parr and C. D. Ellis.

KANSAS CITY, MO.—The Wilde Drop Forge & Tool Co. has been incorporated with $5,000 capital stock by M. and G. Wilde and Paul Froeschl.

KANSAS CITY, MO.—The Sheet Metal Products Co., 1819 Central street, plans a 1-story plant building, 125 x 300 feet, to cost $60,000.

New Trade Publications

SQUEEZER—The Arcade Mfg. Co., Freeport, Ill., is circulating a 4-page illustrated bulletin in which air and hand-operated squeezers are described and illustrated. Specifications are given.

PUNCHES AND DIES—The Cleveland Punch & Shear Works Co., Cleveland, has published a cardboard circular in which attention is called to the importance of punches and dies in production work. The folder is illustrated showing three operations in adjusting small tools.

SHIPPING—The Cunard Steam Ship Co., Ltd., New York, has published a large illustrated booklet which really is a pictorial history of the company's transatlantic service since 1840. Illustrations in color of the company's vessels from 1840 to the present time are given and the text is extremely interesting.

REFINERY EQUIPMENT—The Griscom-Russell Co., New York, is circulating an 8-page illustrated bulletin in which oil coolers, heat exchangers and sub-cooling condensers for use at oil refineries are described and illustrated. A list of the uses for heat transfer apparatus in oil refinery operations is given.

SADDLERY HARDWARE—The United States Chain & Forging Co., Pittsburgh, has published a 36-page illustrated booklet in which harness chain, miscellaneous chain and saddlery hardware are described and illustrated. A 4-page leaflet also accompanies the booklet in which attention is called to a newly patented handy strap chain with wrought steel buckle. This latter was designed especially for the farmer but it is said will be handy and convenient in all lines of industry.

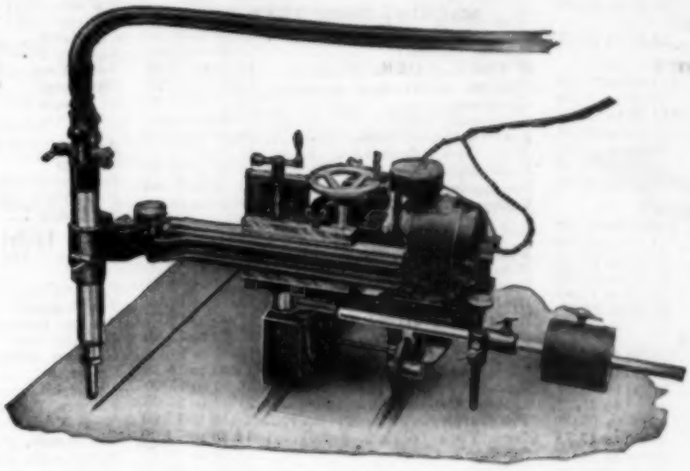
GYPSUM ROOFS—A 16-page illustrated booklet has been published by the H. E. Marks Corp., Pittsburgh, in which a system of gypsum roofs is described and illustrated. The booklet is replete with details concerning construction, specifications, etc., and the descriptions are supplemented with numerous illustrations of actual roof construction. This system of roof construction consists of steel tees supported on roof purlins, gypsum board panels, galvanized wire fabric reinforcement and a poured-in-place gypsum or concrete slab.

STEAM PRODUCTION—An interesting booklet entitled "Cutting the Cost of Producing Steam," has just been issued by the Detroit Stoker Co., Detroit. The booklet, which is of 16 pages, is devoted to describing and illustrating mechanical stokers manufactured by the company. The application of advanced engineering principles to modern stoker design is pointed out and one section of the booklet is devoted to describing the service and operation of the stoker. The bulletin is extremely interesting and easily is one of the most readable pieces of industrial literature issued in the power equipment field.

DEMAND METER—The General Electric Co., Schenectady, N. Y., has published an 8-page illustrated bulletin in which a demand meter, designed for use in combination with a watthour meter to indicate maximum demand is described and illustrated. This meter is of the "block interval" type indicating the maximum demand integrated and averaged over a definite time interval. The windings of this meter are adapted for a maximum of 240 volts and can be furnished self-contained for use on all standard frequencies. For operation on higher voltages such as 440 or 550 a small transformer is furnished to provide a source of 110 volts for the motor and operating coil. Standard time intervals are 15, 30 and 60 minutes and the meter is not recommended for intervals of less than 15 minutes.

AIRCO
DAVIS
APPARATUS

ANYTHING AND EVERYTHING
FOR OXYACETYLENE WELDING AND CUTTING



AIRCO-DAVIS-BOURNONVILLE RADIAGRAPH

MACHINE cutting is one of the greatest achievements of Airco-Davis-Bournonville in the advancement of the oxyacetylene industry.

The Radiagraph, Oxygraph, Camograph, and Pyrograph are some of the exclusive machines designed by Airco-Davis-Bournonville experts for mechanical cutting of steel plates, forgings, dies, etc.

The No. 1A Radiagraph, illustrated above, is a portable, motor-driven machine which may be used for cutting along straight or curved lines at constant speed adjusted according to thickness of plate and size of torch-tip used. There are ten variations of speed, and iron or steel of all thicknesses from ¼ to 20 inches or more may be so cut.

The Radiagraph provides greatly increased production and reduced operating costs in fabricating plants, steel mills, boiler shops, bridge works, and locomotive and car shops. The Airco Consulting Engineering Staff will be pleased to discuss with manufacturers and others the advantages of specially designed machinery for mechanical cutting and welding.

Special Bulletin, illustrating and describing mechanical cutting on production work, will be sent on request.

Write for Airco booklet:
"Anything and Everything for Oxyacetylene Welding and Cutting"

AIR REDUCTION SALES COMPANY

Manufacturer of Airco Oxygen — Airco Acetylene — Airco-Davis-Bournonville Welding and Cutting Apparatus and Supplies, Acetylene Generators, and Specially Designed Machines for Automatic Welding and Cutting — Nitrogen, Argon and other Airco Atmospheric Gas Products.

Controls the manufacture and sale of National Carbide

Home Office: 342 Madison Avenue, New York, N. Y.

Airco District Offices, Plants and Distributing Stations conveniently located throughout the Country.

"Airco Oxygen and Acetylene Service is Good Service."

SERVICE

ECONOMY

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	$15.00 to 20.00
Boston (dealers)	15.50 to 16.50
Buffalo	19.50 to 20.50
Chicago	19.50 to 19.00
Cincinnati	16.50 to 17.50
Cleveland	19.50 to 19.75
Eastern Pennsylvania	18.00 to 19.00
New York (dealers)	14.00 to 14.50
Pittsburgh	21.50 to 22.00
San Francisco	11.50
St. Louis	18.00 to 18.50
Valleys	21.75 to 22.00
No. 1 railroad steel New York (dealers)	14.75 to 15.25

BUNDLED SHEETS

Buffalo	$14.00 to 15.00
Cleveland (hydraulic)	17.25 to 17.75
Cincinnati	13.00 to 14.00
Eastern Pennsylvania	15.50 to 16.00
Pittsburgh	17.00 to 17.50
St. Louis	10.00 to 10.50
Valleys (hydraulic)	19.50 to 20.00

STEEL RAILS, SHORT

Birmingham	$16.00 to 17.00
Boston (dealers)	15.50 to 16.50
Chicago	21.00 to 21.50
Cincinnati	17.50 to 18.00
Cleveland	16.25 to 17.00
St. Louis	22.00 to 22.50

STOVE PLATE

Birmingham	$18.00 to 20.00
Boston (consumers)	17.00 to 17.50
Buffalo	17.00 to 18.00
Chicago	19.75 to 20.25
Cincinnati (net)	15.00 to 16.00
Cleveland	17.00 to 17.75
Eastern Pennsylvania	15.00 to 16.00
New York (dealers)	14.50 to 15.00
Pittsburgh	18.00 to 18.50
St. Louis	17.50 to 18.00

LOW PHOSPHORUS

Buffalo	$21.00 to 22.00
Cincinnati	18.00 to 18.50
Eastern Pennsylvania	22.00 to 23.00
Pitts. billet and bloom crops	25.00 to 26.00

SHOVELING STEEL

Chicago	$18.25 to 18.75
Pittsburgh	18.00 to 18.50
St. Louis	17.50 to 18.00

KNUCKLES, COUPLERS & SPRINGS

Chicago	$22.50 to 23.00
Eastern Pennsylvania	21.00 to 22.00
Pittsburgh	24.50 to 25.00
St. Louis	23.50 to 24.00

COMPRESSED SHEETS

Buffalo	$18.00 to 19.00
Chicago	15.50 to 16.00
Pittsburgh	19.00 to 20.00

FROGS, SWITCHES, GUARDS

Chicago	$18.50 to 19.00
Eastern Pennsylvania	18.00 to 19.00
St. Louis	19.75 to 20.25

BOILER PLATE, CUT

St. Louis (dealers)	13.00 to 13.50

ANGLE BARS—STEEL

Chicago	$20.00 to 20.50
St. Louis	20.00 to 20.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	$20.00 to 22.00
Boston (dealers)	16.50 to 17.00
Buffalo	19.00 to 20.00
Chicago, No. 1	20.50 to 21.00
Chicago, No. 2	19.00 to 19.50
Cincinnati, No. 1	15.00 to 16.00
Cleveland, No. 1	12.00 to 12.25
Eastern Pennsylvania, No. 1	22.00 to 23.00
Pittsburgh, No. 1	19.00 to 20.00
Pittsburgh, No. 2	21.50 to 22.00
New York, No. 1 (dealers)	16.00 to 16.50
St. Louis, No. 1	19.50 to 20.00
St. Louis, No. 2	18.50 to 19.00

WROUGHT PIPE

Boston (dealers)	$12.00 to 12.50
Buffalo	14.00 to 14.50
Eastern Pennsylvania	16.50 to 17.00
New York (dealers)	12.75 to 13.25

YARD WROUGHT

Boston	$14.00 to 15.00
Eastern Pennsylvania, No. 1	20.50 to 21.50

CITY WROUGHT

New York, long	$13.50 to 14.00

BUSHELING

Buffalo, No. 1	$17.00 to 18.00
Chicago, No. 1	17.25 to 17.75
Chicago, No. 2	10.00 to 10.50
Cincinnati, No. 1	14.00 to 15.00
Cleveland, No. 1	15.50 to 16.00
Cleveland, No. 2	13.50 to 13.75
Eastern Pennsylvania, No. 1	14.50 to 15.00
Pittsburgh, No. 1	18.00 to 18.50
St. Louis, No. 1	15.75 to 16.75

MACHINE SHOP TURNINGS

Birmingham	$9.00 to 10.00
Boston (dealers)	11.50 to 12.00
Buffalo	14.50 to 15.50
Chicago	13.00 to 13.50
Cleveland	14.25 to 14.50
Cincinnati (net)	13.00 to 14.00
Eastern Pennsylvania	16.00 to 17.00
New York (dealers)	11.75 to 12.25
Pittsburgh	16.00 to 16.50
St. Louis	11.00 to 11.50
Valleys	16.25 to 16.50

CAST IRON BORINGS

Birmingham (chemical)	$15.00 to 16.00
Birmingham, borings (plain)	12.00 to 13.00
Boston (chemical)	17.50 to 18.00
Boston (dealers)	15.00 to 16.00
Buffalo	17.00 to 18.00
Chicago	15.50 to 16.00
Cincinnati (net)	13.00 to 14.00
Cleveland	15.00 to 15.50
Eastern Pennsylvania	16.50 to 17.00
Eastern Pennsylvania (chemical)	23.00 to 25.00
Pittsburgh	17.50 to 18.00
New York (dealers' price)	12.50 to 13.00
St. Louis	13.00 to 13.50
Valleys	18.00 to 18.25

MIXED BORINGS AND TURNINGS

(For blast furnace use)

Boston (dealers)	$11.50 to 12.00
Cleveland, small	15.00 to 15.25
Eastern Pennsylvania	15.00 to 15.50
New York (dealers)	11.75 to 12.25

IRON AXLES

Birmingham	$23.50 to 25.00
Boston	27.00 to 28.00
Buffalo	24.00 to 25.00
Chicago	29.50 to 30.00
Cincinnati	23.00 to 24.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	23.00 to 24.00
Pittsburgh	29.00 to 30.00
St. Louis	29.50 to 30.00

IRON RAILS

Buffalo	$19.00 to 20.00
Chicago	23.50 to 24.00
Cincinnati	16.00 to 17.00
Cleveland	18.00 to 18.50
St. Louis	20.00 to 20.50

PIPES AND FLUES

Chicago	$14.25 to 14.75
Cincinnati	12.00 to 13.00
Cleveland	15.00 to 15.50
St. Louis	12.00 to 12.50

RAILROAD GRATE BARS

Buffalo	$16.00 to 17.00
Chicago	20.25 to 20.75
Cleveland	17.00 to 17.75
Eastern Pennsylvania	16.00 to 17.00
New York (dealers)	12.00 to 12.50
St. Louis	18.50 to 19.00

FORGE FLASHINGS

Boston (dealers)	$11.50 to 12.00
Chicago, small	12.00 to 12.50
Cleveland	15.50 to 16.00
Cleveland, large	14.50 to 15.00

FORGE SCRAP

Boston	$11.50 to 12.00
Chicago	19.00 to 19.50
Eastern Pennsylvania, No. 1	16.00 to 16.50

ARCH BARS AND TRANSOMS

Chicago	$25.50 to 26.00
St. Louis	24.50 to 25.00

ANGLE BARS—IRON

Chicago	$25.50 to 26.00
St. Louis	24.00 to 24.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	$12.00 to 12.50
Buffalo	17.50 to 18.50
Chicago	15.50 to 16.00
Cleveland	17.00 to 17.25
Eastern Pennsylvania	15.00 to 16.00
Pittsburgh	18.50 to 19.00
St. Louis	13.00 to 13.50

STEEL CAR AXLES

Birmingham	$22.00 to 23.00
Boston (dealers)	23.50 to 24.00
Buffalo	21.00 to 22.00
Chicago	22.00 to 22.50
Cleveland	26.00 to 27.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	17.00 to 18.00
Pittsburgh	24.00 to 24.50
St. Louis	23.00 to 23.50

SHAFTING

Boston (dealers)	$18.50 to 19.50
Chicago	25.00 to 25.50
Eastern Pennsylvania	24.00 to 25.00
New York (dealers)	16.00 to 16.50
St. Louis	20.00 to 20.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	$19.00 to 20.00
Birmingham, tram car	22.00 to 23.00
Boston (consumers)	18.50 to 19.50
Buffalo, iron	21.00 to 22.00
Chicago, iron	24.50 to 25.00
Cincinnati	19.00 to 19.50
Cleveland, iron	13.00 to 13.50
Eastern Pennsylvania, iron	22.00 to 23.00
New York, iron (dealers)	15.00 to 16.00
Pittsburgh, iron	23.50 to 24.00
Pittsburgh, steel	24.50 to 25.00
St. Louis, iron	25.00 to 25.50

NO. 1 CAST SCRAP

Birmingham, cupola	$20.00 to 23.00
Boston (consumers)	22.00 to 23.00
Buffalo	21.00 to 22.00
Chicago, cupola	24.00 to 24.50
Cincinnati, No. 1, machinery, cupola (net)	19.50 to 20.00
Cleveland, cupola	22.00 to 22.50
Eastern Pennsylvania, cupola	23.00 to 25.00
New York, cupola dealers)	17.50 to 18.00
Pittsburgh, cupola	23.50 to 24.00
San Francisco	26.00
St. Louis, agricultural	23.50 to 24.00
St. Louis, railroad	23.00 to 23.50
Valleys	22.00 to 22.50

HEAVY CAST

Boston (consumers)	$19.50 to 20.00
Buffalo	18.00 to 19.00
Cleveland	17.00 to 17.25
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	16.50 to 17.00
Pittsburgh	21.00 to 21.50

MALLEABLE

Boston (railroad)	$19.50 to 20.00
Buffalo	20.50 to 21.50
Chicago, railroad	24.50 to 25.00
Chicago, agricultural	24.50 to 25.00
Cincinnati, agricultural	16.00 to 17.00
Cincinnati, railroad	17.00 to 18.00
Cleveland, agricultural	18.50 to 19.00
Cleveland, railroad	20.00 to 21.00
Eastern Pennsylvania, railroad	21.00 to 22.00
Pittsburgh, railroad	22.00 to 22.50
Pittsburgh, agricultural	18.00 to 18.50
St. Louis, agricultural	22.00 to 22.50
St. Louis, railroad	22.00 to 22.50

Miscellaneous Scrap

RAILS FOR ROLLING

5 feet and over

Birmingham	$19.00 to 21.00
Boston (dealers)	15.50 to 16.00
Chicago	30.50 to 21.00
Cleveland	24.00 to 25.00
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	13.50 to 14.50
Pittsburgh district	24.50 to 25.00
St. Louis	22.00 to 22.50

LOCOMOTIVE TIRES

Chicago	$19.50 to 20.00
St. Louis	17.00 to 17.50

LOW PHOSPHORUS PUNCHINGS

Chicago	$19.50 to 20.00
Eastern Pennsylvania	21.00 to 22.00
Pittsburgh	24.00 to 25.00

"The Bache Review"

THIS WEEK WILL SAY:

NEW YORK, JANUARY 14, 1922

Among the many financial journals and bulletins which make a point of quoting the Iron Trade Review as their authority on information pertaining to iron and steel is The Bache Review, issued by J. S. Bache & Co. of New York. The Bache Review has a wide reputation for its accuracy in summarizing the business and industrial situation.

Last Year's Records—Iron, Ships, Foodstuffs

Statistics for 1921 continue to come in. Among others, those compiled by The Iron Trade Review show that the world's iron and steel production sank for the year to a low level, which may never again be equalled.

In 1913 the world produced almost twice as much steel and more than twice as much pig iron as last year—namely, 74,600,000 tons of ingots against 40,700,000 last year; and 76,594,000 tons of pig iron against 35,810,000 last year. At the highest point of war production, the steel output reached 82,650,000 gross tons. Today, the world's pig iron capacity is probably about 70,000,000 tons, and steel output about 80,000,000 tons.

400 Newspapers Regularly Quote

IRON TRADE REVIEW

CLEVELAND

The international reputation and the World-wide circulation of the IRON TRADE REVIEW is the result of year after year of unfailing Editorial accuracy and reliability.

PROOF—

THE IRON TRADE REVIEW

"The Most Widely Quoted Trade Paper In The World"

Iron and Steel Production

Compiled By THE IRON TRADE REVIEW

Pig Iron

	-Stacks- No.	In	—Output— Total	Av. daily
1907				
January	376	311	2,174,801	69,509
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,299,732	
1908				
January	398	139	1,081,813	34,316
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,680,140	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,186
October	413	309	2,589,681	84,001
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,337,002	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,747
March	417	310	2,588,736	83,580
April	418	291	2,477,700	82,590
May	421	206	1,871,388	60,367
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,793	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,192
Total			26,840,314	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,867
April	421	220	2,044,904	68,163
May	421	206	1,871,388	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,287,800	89,929
February	423	306	2,778,670	92,095
March	423	278	2,562,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,716,825	90,865
June	422	283	2,816,883	87,229
July	422	264	2,658,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,594,098	83,137
October	425	244	2,439,924	81,933
November	424	225	2,529,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	355	3,238,970	104,483
September	431	344	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,794
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,602
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,270
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,780	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,927,088	68,906
March	436	103	1,593,542	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	435	69	954,901	30,802
September	435	84	985,795	32,857
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,545,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,034,784	65,638
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	188	2,016,778	67,225

Lake Ore Shipments

Gross Tons, Rail and Water

1921	22,799,077
1920	60,411,572
1919	48,546,651
1918	62,836,172
1917	64,437,003
1916	66,658,466

Ingots and Castings

By American Iron and Steel Institute

	Ingots	Castings	Total
1910	25,154,087	940,832	26,094,919
1911	23,029,479	646,627	23,676,106
1912	30,284,682	966,621	31,251,303
1913	30,280,130	1,020,744	31,300,874
1914	22,819,784	693,246	23,513,030
1915	31,284,212	866,824	32,151,036
1916	41,401,917	1,371,763	42,773,680
1917	43,619,200	1,441,407	45,060,607
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797

Monthly Ingot Output

Gross Tons

1922	87.48 per cent of capacity	Indicated total
January	1,593,482	1,820,000
February	1,745,022	1,995,000
March	2,370,751	2,710,000
April	2,444,513	2,800,000
May	2,711,141	3,100,000
June	2,634,477	3,010,000
July	2,487,104	2,840,000
August	2,214,582	2,530,000